Vol. 9. No. 8.

COMMONWEALTH INSTITUTE OF BIOLOGY LIBRARY
- 6 JUL 1978

WEED ABSTRACTS

August 1960

NOTES FOR READERS OF WEED ABSTRACTS

Weed Abstracts endeavours to provide a comprehensive coverage of the world's literature on weeds, weed control and closely allied subjects. To this end over 370 journals and nearly 100 annual reports are regularly searched. Other journals, reports, bulletins, etc. are abstracted as they are seen. Additional coverage is obtained through agreements with other abstracting organisations.

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As far as possible journal abbreviations given in the World List of Scientific Periodicals are used. Holding libraries in Oxford and elsewhere are also taken from the World List, e.g. O.BO. = Botany Department, Oxford. Numbers at the end of abstracts, e.g. 75(492) are for internal use only.

When a paper is by more than one author, only the address of the first author is given.

Where an abstract is taken from an abstracting journal the acknowledgement follows the abstract, e.g. Herb.Abstr., 2,163. Where it is only quoted in part the acknowledgement is preceded by the word "from", e.g. From Biol.Abstr., 2,294.

The Information Section is always pleased to receive comments and suggestions for the improvement of Weed Abstracts.

* An asterisk before the author's name indicates that only the title of the paper has been seen.

Continued from the inside back cover.

ac	- acre(s)	in.	- inch(es)	p.s.i.	- pounds per square in.
a.e.	- acid equivalent	kg	- kilogram(s)	v/v	- volume/volume
a.i.	- active ingredient	l	- litre(s)	w/v	- weight/volume
cm	- centimetre(s)	lb	- pound(s)	w/w	- weight/weight
d.b.h.	- diameter at breast height	m	- metre(s)	>	- greater than
ft	- foot (feet)	ml	- millilitre(s)	<	- less than
g	- gram(s)	oz	- ounce(s)	#	- pounds per acre
gal	- gallon(s)	post-em.	- post-emergence	±	- with or without
ha	- hectare(s)	pre-em.	- pre-emergence		
		p.p.m.	- parts per million		

Language abbreviations: an initial capital denotes the language of the article, a small letter that of the summary: - Dan. - Danish, Du. - Dutch, E. - English, F. - French, G. - German, It. - Italian, Jap. - Japanese, Nor. - Norwegian, Russ. - Russian, Span. - Spanish, Sw. - Swedish.

See also 1469, 1484, 1485, 1490, 1491, 1492, 1539

1382. HARRIS, J.M., APPLEWHITE, C.D. and BROADUS, E.P. Dicryl, a new selective post-emergent herbicide for cotton. Proc. 13th annu.Meet.Sth.Weed Conf., 1960, 235-41.
In 2 years' field tests Dicryl (N-(3,4-dichlorophenyl)methacrylamide) has controlled Digitaria spp., Brachiaria spp., Cyperus spp., Ipomoea spp., Amaranthus spp., Xanthium spp., Portulaca spp., and Chenopodium album but not Cyperus rotundus, Sorghum halepense, Cynodon dactylon or other deep rooted perennials. Its action is dependant primarily on foliage absorption. It is recommended post-em. in cotton, to be applied at least 7 days after emergence. In trials with 1 # in 14 gal water no injury was caused to cotton 12 days old but application 7 days after emergence caused temporary stunting and a slight check to fruiting but no yield reduction. Weeds were best controlled when 0.5-1.5 in. high or up to 12-14 days old. Volume rates of 12 gal/ac (= 4 gal/ac for band treatment) and lower caused injury to cotton but did not reduce yields or affect weed control. A rate of 40 gal/ac is recommended, preferably in a semi-directed spray (obtained by using 2 off-centre nozzles held 12 in. apart and 5 in. from ground level). Simulated rainfall of ca. 0.5 in. applied 1-24 hours after treatment did not affect the herbicidal action. Chemical and toxicological data are also given (see Weed Abstr., 9, 1383). - D.M.L.S. [O.W.]

1383. UNITED STATES. 1960 Technical information. Dicryl an experimental herbicide. Tech.Inf.Sheet Niagara Chem. Div., 1960, pp.12.
N-(3,4-dichlorophenyl)methacrylamide is a white powder of melting point 121-128°C. It is insoluble in water, <5% in Xylene, 33% in pyridine, 50% in hexamethylphosphoramide, 25-33% in isophorone, 20% in acetone, 51% in dimethylformamide and 16.7% in methyl isobutyl ketone. The compound is available as a 19.5% emulsifiable concentrate. The oral LD 50 to rats is 3160 mg/kg, the acute intraperitoneal 1780 mg/kg and the acute dermal LD 50 to rabbits ca. 10 000 mg/kg. 3 mg applied to the eyes of a rabbit produced mild transitory irritation; it caused no skin sensitization in guinea pigs. In a 28-day feeding test 1% in the diet reduced survival. The acute LD 50 of Dicryl 2 E.C. is 1800 mg/kg. The compound has been registered in the U.S.A. on a no-residue basis for cotton.
Annual broadleaved weeds should be <2 in. when treated and grasses <1.5 in. Crops tolerant of overall sprays are broccoli, cabbage, carrots, cauliflower, celery, cotton, cucumber, flax, parsley, peanuts, glacier ivy, gladioli and vinca. Crops tolerant of directed sprays are asparagus, maize, sweet corn, onions, peas, southern peas, soybeans, Arbor vitae, azaleas, boxwood, carnations, chrysanthemums, dahlias, roses and Taxus cuspidata. Susceptible crops include lucerne, lettuce, lima beans, oats, peas, peppers, potatoes, ryegrass, safflower, seedling onions, snapbeans, spinach, winter squash, strawberry, sugar beet, red beet, tobacco, tomato, pansy, white clover and seedbeds of larch, white spruce and Scots pine. Application in cotton at 3-4 # when the first true leaf is as big as the cotyledons is advised. Split applications 5-7 days apart of 2 + 1 # are recommended. A list of susceptible and resistant weeds is given. - L.K. [O.W.]

1384. HOLSTUN, J.T. and BINGHAM, S.W. Several triazines as selective post-emergence herbicides in cotton. Weeds, 1960, 8,(2), 187-97, figs.3,tabs.1,bibl.23.
Methoxy-simazine, ipazine, CDT (2-chloro-4,6-bis(diethylamino)-s-triazine, simazine, propazine, trietazine and 2-chloro-4-propylamino-6-isopropylamino-s-triazine (1) were applied directionally to cotton 12 in. tall at 1.5-12 # and to cotton 3 and 6 in. tall at 1.5 # in either Phytobland oil or water + surface active agent. None of the compounds injured cotton at the 12 in. stage, but at earlier stages simazine, propazine and (1) were injurious, while trietazine and CDT gave inadequate weed control. The use of oil as a carrier somewhat increased the effect on crop and weeds. Where diuron had been applied pre-em. before application of the triazines, reductions in yield were caused. Methoxy-simazine and ipazine 1-2 # appear to be the most promising treatments on young cotton and simazine on older cotton (as it gave the best weed control). - L.K. [O.W.]

1385. HOLSTUN, J.T., WOOTEN, O.B., McWHORTER, C.G. and CROWE, G.B. (Agric.Exp. Sta.,Stoneville,Miss.,U.S.A.) Weed control practices, labour requirements and costs in cotton production. Weeds, 1960, 8,(2), 232-43, tabs.6,bibl.8.
Presents an analysis of the costs of weed control in cotton at the Mississippi Agric

ultural Experiment Station over 3 years with varying levels of weed infestation. The methods used all included cultivations + hoeing and had as the extra treatments flaming, pre-em. herbicide ± flaming, post-em. herbicide ± flaming or pre- + post-em. herbicide ± flaming. - L.K. [O.W.]

1386. GALASHINA, M.L. and MELNIKOV, N.N. Preharvest removal of cotton-plant leaves. Org. Insektofungitsidyi Gerbitsidy, 1958, 300-3.

Of sodium ethylxanthate, $CaCN_2$, fatty and aromatic amides of chloroacetic acid, trichloroacetic acid, and thiocyanoacetic acid, tested as defoliants, the p-toluidide of chloroacetic acid possessed satisfactory activity. The amides of the haloacetic acids were prepared by treating chloroacetyl chloride or trichloroacetyl chloride with excess amine in ether solution. - From Chem. Abstr., 54, 10217 h. - M.E.L.

1387. ELLIOTT, F.C. (A. & M. Coll., Coll. Sta., Texas, U.S.A.) Extension aspects of weed control in cotton in Texas in 1959. Proc. 13th annu. Meet. Sth. Weed Conf., 1960, 254-7. [O.W.]

1388. REA, H.E. (Agric. Exp. Sta., Coll. Sta., Texas, U.S.A.) Controlling thick stands of Johnsongrass in row crops. Proc. 13th annu. Meet. Sth. Weed Conf., 1960, 50-2, tabs. 2.

A 95% infestation of Johnsongrass [Sorghum halepense] in cotton was controlled 99% by spot treating with a 1:1 mixture of naphtha and diesel oil at a cost of $21.25/ac. The previous year 98% control of an 85% stand was given by 10-12 treatments totalling for first 4 treatments dalapon 10 #, hexachlorocyclopentadiene in kerosene, dalapon 14 + TCA 26 lb, 50 gal naphtha + 50 gal kerosene, 3 gal HCA [hexachloroacetone] at costs varying from $29-53/ac. A 75% infestation of Johnsongrass in forage sorghum was reduced 95% by 3 spot treatments of 10 lb dalapon ester in 100 gal of phytotoxic oil. - L.K. [O.W.]

1389. PORTER, W.K., THOMAS, C.H., SLOANE, L.W. and MELVILLE, D.R. Proc. 13th annu. Meet. Sth. Weed Conf., 1960, 30. A proposed method for post-emergence weed control in cotton. (Abstract)

Application of dicryl (N-(3,4-dichlorophenyl)methacrylamide) to cotton when the hypocotyl was elongating caused only transient injury. Directed application when cotton was 2-3 in. tall gave no injury and better weed control. Split applications of dicryl gave better results than single applications. It is suggested that Dicryl be applied at 0.5-0.66 # on a 14 in. drill by 2 OC02 nozzles set 12 in. apart and 5 in. above the soil, the first application 8-10 days after crop emergence and the second 6-8 days later. If no early weeds are present application may be delayed till weeds are 0.5 in. high. - L.K. [O.W.]

1390. FRANS, R.E. (Agric. Exp. Sta., Fayetteville, Arkansas, U.S.A.) Formulation and incorporation effects of pre-emergence herbicides on corn. Proc. 13th annu. Meet. Sth. Weed Conf., 1960, 32-8, tabs. 4, bibl. 5.

Simazine 0.5-2 #, EPTC 1-4 #, CDAA 1-4 #, diuron 0.25-1 # and 2,4-D (isooctyl) 1-4 # were applied as sprays and granules + incorporation (by raking into the surface 2 in. of soil immediately after application) pre-em. to Texas 30 maize. The main weeds were Digitaria sanguinalis, D. ischaemum and Brachiaria spp. Incorporation reduced weed control except for EPTC, and applying as granules also tended to reduce weed control except for EPTC and CDAA. Satisfactory weed control for 9 weeks was given only by simazine 1 and 2 #, diuron 1 # and for 4 weeks by 2,4-D 1 and 2 #. Only 2,4-D 4 # reduced yields markedly and all other compounds gave some yield increase, the most was from diuron 1 # which was the only treatment to yield significantly more than the control. - L.K. [O.W.]

1391. UNITED STATES. Ecological, physiological, and edaphic aspects of weed control. Abstr. Meet. Weed Soc. Amer., 1960, 28-47. [44 Reports]

Quackgrass [Agropyron repens]. Atrazine, simazine, propazine, methoxypropazine and G-30026 (2-chloro-4-methylamino-6-isopropylamino-s-triazine) 2-4 # gave control when applied in the autumn or early spring but not at the time of planting maize. Maize planted 1 week after treatment was injured only by methoxypropazine; oats planted 12-18 months later did not suffer serious injury. Death is thought to be due to the depletion of carbohydrate reserves.

Amitrol in vitro has been found not to inhibit glucose oxidase, whereas inhibition did occur of tyrosinase, fatty acid peroxidase and lactoperoxidase. Inhibition of lactoperoxidase which is thought to be non-competitive was reversed by dialysis against dilute saline but not by increase in concentration of H_2O_2.

Bromus tectorum was grown at 4, 16, 64 and

256 plants/ft^2 together with crested wheatgrass - high weed densities decreased shoot and root growth and increased mortality of crested wheatgrass. With increasing density total root and shoot growth of Bromus increased as did depletion of soil moisture.

Dalapon was found to enter through the cuticle and stomata of Tradescantia, particularly the latter in the presence of a surface active agent. Entry occurred most readily at low pH unless acute contact toxicity occurred. Free acid and sodium salts had similar activity; the ammonium, potassium and calcium salts were less active. Absorption and translocation were protracted; some dalapon was retained along the path of transport and movement was restricted in the intercalary meristems of grasses. Transport occurred readily in the transpiration stream and phloem and movement from phloem to xylem was found. Accumulation and retranslocation to new sites of high metabolic activity were observed in cotton, sorghum and maize. Penetration, translocation and metabolic inactivation are not thought to determine whether species are tolerant or resistant.

Wild garlic [Allium vineale] has been found to contain an inhibitor of starch synthesis.

Cyperus rotundus. Observations in Georgia showed that during the first week after emergence growth consisted primarily of shoot and root elongation. During the second week rhizomes had elongated to 8-10 cm and were differentiated into leaves, basal bulbs, roots and new rhizomes and this continued for 6 weeks with no dormant tuber formation. After 6-8 weeks flowering occurred. After 8 weeks some dormant tubers were found and after 12 weeks some chains of 2 tubers only were found. When applied 1-20 weeks after emergence amitrol was found to decrease in activity with later application; considerable variation between different tubers treated at the same stage was found.

Avena fatua. Germination was inhibited by soaking in water for 24 hours and then transferring to moist filter paper for 4 days.

Amitrol. The amount required to reduce the growth of yeast was very greatly increased by L-histidine except in the case of histidine requiring mutants. D-histidine, histidinol, L-amino acids, purines, pyrimidines, or B-vitamins did not have this effect and Salmonella which is less sensitive to amitrol did not react in this way. Applications of histidine to cereals and tomatoes were inconclusive.

Cirsium arvense plants gathered from 10 locations in 4 states were found to differ in amount of growth, time of shoot emergence, height of shoot growth, date of flowering and seed maturity.

Mesquite [Prosopis juliflora] was more sensitive to 2,4,5-T applied to the basal leaf than to the cotyledons, whereas with 2-methyl-3,6-dichlorobenzoic acid the reverse was true.

Amitrol browning of leaves was promoted by high temperatures, light intensities and longer photoperiods and these conditions reduced growth inhibition. Chlorosis was decreased by high temperatures, low light intensities and long photoperiods.

2,4-D applied to the foliage of wheat seedlings was found to cause cell division and differentiation of lateral roots but to inhibit their elongation.

EPTC lost its activity most rapidly in a clay soil and least rapidly in a stony sand.

Vernonia baldwini had lowest carbohydrate root reserves at full bud to first flower stage; it was also low in late May when very rapid growth was taking place.

Formative effects from 2,4-D after exposure to ultra violet light were prevented by placing the plants in darkness after treatment.

2,4-dinitrophenol caused much more injury when plants were placed in darkness after treatment than when kept in the light; catechol behaved in the opposite way.

N-phenyl-2-methylpentanamides. The 3,4-dichloro- derivative was the most active in inhibiting the Hill reaction of any of the 9 chloro derivatives tested.

High humidity (90-95%) for 5 days after applying 2,4,5-T to mesquite seedlings resulted in significantly greater phytotoxicity than low humidity (30-35%). Pre-treatment exposure to either high or low humidity appeared to decrease sensitivity unless followed by similar post-treatment exposure.

Echinochloa crusgalli. Biotypes were found which varied in their response to dalapon. At the single leaf stage plants were significantly more susceptible than later. The optimum temperature for germination appears to be 23-25°C.

Hydrolyzable phosphates were decreased in plants treated with 2,4-dinitrophenol, particularly if subjected to darkness after treatment. In plants treated with 2,4-D there was an increase followed by a decrease; darkness after treatment caused somewhat more injury than light.

Arsenicals. The toxicity of disodium methyl arsonate (1) to Digitaria sanguinalis increased with temperature; cacodylic acid and sodium arsenite showed no such consistent trend. Radioactive (1) was translocated in soybeans and Digitaria and at 85° it was twice

as rapid as at 60°. Sodium arsenite was translocated to a lesser extent.

Leafy spurge [Euphorbia esula]. At 7-10 days seedlings produce vegetative buds. No inflorescence is produced the first year. Maximum shoot density (ca. 200-1000 shoots/m^2) is usually reached in June or July. Grasses may limit spread, but will not reduce established stands. Patches usually spread 1-3 ft/year. Severed roots will send up new shoots from 3 ft.

Simazine in culture solutions was absorbed and distributed throughout seedling oats in 3 hours. Aerating the culture increased the amount of radioactivity in the roots but not in the leaves. Absorption and translocation were greater at 37°C than at 26°C. Transport was directly related to transpiration. The concentration of C^{14} was 3 times as great in oats as in cotton. A measurable amount of simazine was metabolised during the 24 hour exposure period.

Diphenylacetonitriles. Screening tests showed the compounds to possess specific activity against seedling grasses and that: (1) activity similar to the diphenylacetonitrile itself was retained in mono-substituted derivatives only with chlorine or fluorine in the 3- or 4-positions on 1 of the phenyls; alkyl or alkoxy substitution eliminated activity. (2) With dichloro-substituted compounds only the 3,4- showed much activity. (3) Replacement of 1 phenyl by phenoxy reduced activity and selectivity; similar substitution by p-biphenylyl, α-naphthyl, cyclohexyl, α-pyridyl or hydrogen eliminated activity. (4) Substitution at the α-carbon by halogen, alkyl, aryl or other groups removed activity. (5) With diphenylacetonitrile, restricted by ortho bonding of 1 of the phenyls, activity against seedling grasses was lost. (6) Some of the acids and amides derived from the nitriles were tested; only diphenylacetamide was active against seedling grasses. (7) Studies with butyronitrile and propionitrile homologues suggested the butyronitrile was degraded by β-oxidation.

Competition from Setaria spp. with maize was greatest where nitrogen applications were lowest but competition from Amaranthus retroflexus and Polygonum pensylvanicum was greatest where nitrogen was highest.

Monuron activity was markedly decreased by high temperatures for a brief period at the time of application.

Convolvulus arvensis. The differences in morphological, anatomical and histological responses of 2 strains (varying in susceptibility) to 2,4-D are briefly described.

Benzoic and phenylacetic acids substituted in the 2-, 3- and 6-positions applied pre-em. were more toxic to soybeans and wheat than 2,4-D and 2,4,5-T. The benzoics were most toxic to soybeans and the phenylacetics to wheat. - L.K. [O.W.]

1392. SMITH, R.J. (U.S.Dep.Agric., Stuttgart, Arkans., U.S.A.) 3,4-Dichloropropionanilide: a promising new herbicide for control of barnyard grass in rice. Proc. 13th annu.Meet.Sth.Weed Conf., 1960, 245-7, bibl.2.

3,4-Dichlorophenylpropionamide was tested in greenhouse and field tests for the control of Echinochloa crusgalli in rice. There was little difference between varieties (Zenith, Nato or Bluebonnet 50), sowing 0.5-1.5 in. deep or applying in 5-40 gal/ac. Pre-planting or pre-em. treatments did not give satisfactory control of Echinochloa; at the 1-3 leaf 4 # was necessary. At the 1-2 leaf stage 32 # was required to cause severe injury to rice, while at the 3-4 leaf stages 8 # was injurious. In vitro concentrations up to 32 p.p.m. caused slight to moderate inhibition and concentrations of 64 p.p.m. and over severe injury. - L.K. [O.W.]

1393. BAKER, J.B. (Univ., Baton Rouge, La., U.S.A.) Preliminary report on the pre-emergence use of O-2,4-dichlorophenyl-O-methyl isopropylphosphoramidothioate to control barnyard grass in rice. (Abstract). Proc. 13th annu.Meet.Sth. Weed Conf., 1960, 242.

In 1959 tests at rates of 3-9 # pre-em. yields of drilled rice were increased 40-50%. In a silt loam 6 # caused no injury to Bluebonnet 50, Magnolia or Nato when planted at depths of 0.5, 1 and 1.5 in. Nato planted at 1 in. showed no injury from 5, 10, 20 and 40 #. In a river sand, however, 6 # caused slight injury to Nato planted 1 in. deep and very severe injury to Nato planted 0.25 in. deep. Laboratory studies on the influence of O-2,4-dichlorophenyl-O-methyl isopropylphosphoramidothioate (Zytron) on the germination and seedling growth of rice and barnyard grass [Echinochloa crusgalli] indicated that rice can tolerate 10 times as much Zytron as E. crusgalli. - D.M.L.S. [O.W.]

1394. UNITED STATES. Weed control in agronomic crops. [19 Reports] Abstr.Meet.

Weed Soc.Amer., 1960, 1-9.

Amitrol in wheat, barley and oats. In investigations over 3 years applications of amitrol to both autumn and spring sown varieties at the 8-10 in., early boot, heading, and fully headed stages showed oats to be tolerant of 2-8 # at all stages;wheat was injured at all stages but some yield was possible from the later treatments; barley yield was eliminated by the early treatments but was not reduced by headed stage applications. Oat germination was not affected whereas that of barley and wheat was nil. Early stage treatments had little residue in oats.

Cotton. Dimethylamine salts of polychloro- and 2,3,6-trichloro-benzoic acids applied to cotton with 2-4 leaves at 5 # killed the cotton and at 1 # caused stunting. 0.1 # of 2,4-D (dimethyl amine or acid), 2,4,5-T (butoxyethanol ester) or 2,4,5-TP (propylene glycol butyl ether ester) caused ca. the same damage as 1 # of the benzoic acids. 2,3,6-trichlorophenylacetic acid was intermediate in its toxicity. Drift studies at low and moderate wind speeds with various pressures and volumes indicated that 40 # of polychlorobenzoic acid could be applied in 75 gal water at 25 lb boom pressure without causing cotton injury more than 10 ft downwind from the treated area.

Soybeans. Amiben 6 # pre-em. gave excellent weed control without reducing yield.

Sugar cane. Dalapon 3 # applied overall at monthly intervals retarded cane growth for 2 months after 2 applications and for 3 months after 3 applications; 4 # applied overall retarded the cane even more. 2 or 3 directed applications at 3 # retarded growth for about 1 month after terminal application.

Wild oats [Avena fatua]. Barbane 1.2 # gave good control of wild oats in the 1.75-2 and 3-leaf stages without adverse effect on wheat, barley, rapeseed or flax. Fortune oats appeared as susceptible as the wild oats. Volumes of 15 and 30 gal/ac had no apparent effect. Avadex (2,3-dichloroallyl diisopropylthiolcarbamate) gave 99% control of wild oats at 1.6 # incorporated, and did not injure barley below 3.6 #. In further trials 1.5 # gave adequate control in stubble and in summer fallow, in soils varying from medium loam to silty clay loam, in soils dry, moist or wet at sowing times, and in growing seasons with rainfalls ranging from 3.5-7.5 in. The volume was normally 10-14 gal/ac, but 3.5 gal/ac was also effective. On stubble land 2 diskings were necessary for incorporation. Rapeseed, barley and flax were uninjured by 6 # and wheat by rates below 2.5 # (some crops were seeded immediately after spraying and some 15 days after).

Rice. Yields were not significantly reduced by amine or ester formulations of 2,4-D, MCPA, 2,4,5-T, 2,4-DB, MCPB or 2,4,5-TP when applied at late tillering or jointing stages, but were significantly reduced by all except 2,4-DB and MCPB when applied at the boot stage, and by 2,4-D (especially) and MCPA at the early tillering stage. The order of toxicity (with the most toxic first) was 2,4-D, MCPA, 2,4,5-T, 2,4,5-TP, 2,4-DB and MCPB. Abnormalities caused by early tillering and boot stage applications are described.

Field bindweed. 2,3,6-TBA 40 # gave complete control of [Convolvulus arvensis] whereas rates under 20 # were not dependable. Disking in did not affect the results. Applications in June, July, August and September were equally effective. Applications gave slightly better control on summer fallow than on stubble. Granules were more effective than the spray.

Small-plot sprayer. A 1-wheeled wheelbarrow type sprayer for use in furrow-irrigated crops is described.

Sorghum. Soil culture studies indicated the following order of toxicity to grain sorghum: most toxic - trietazine; intermediate - neburon, 2,5-dichloro-3-nitrobenzoic acid and 2,4-D; least toxic - amitrol, PCP (sodium). For pre-em. application in irrigated sorghum propazine was the most promising of several herbicides tried.

Diphenylacetonitriles. Diphenylacetonitrile (L-13489) and (p-chlorophenyl) phenylacetonitrile (L-09726) at 12 # pre-em. gave significant control in 5 field experiments of various annual grasses (named) without injuring lucerne, ladino clover, Korean lespedeza, soybeans, bush beans, lima beans or peas and causing only slight transitory chlorosis and stunting to red and crimson clover. Broadleaf weeds were also uninjured. 8 # was less effective, and 4 # or post-em. applications ineffectual.

Sorghum halepense when sprayed with dalapon 20 # at 6, 12 and 24 in. was most susceptible at the earlier stages. Where dalapon was applied in June, no injury was observed in wheat sown in September. Maize and grain sorghum were not affected when planted 3 weeks after dalapon 20 # was applied directly to the soil. In a year of drought during August and September, it was found that July 12th was the last date when S. halepense could be effectively controlled by spraying regrowth at 12 in. (after mowing) with dalapon 20 #. There was no correlation between soil moisture and susceptibility of

S. halepense regrowth or of plants in unmowed plots. - D.M.L.S. [O.W.]

1395. EFFLAND, H. Arbeitswirtschaftliche Vorteile einer chemischen Unkrautbekämpfung in Zuckerrüben. [The advantages of chemical weed control in sugar beet with respect to labour requirements.] Mitt. dtsch.LandwGes., 1959, (14),3-8, (G.), tabs.4.

The use of chemical weed control in sugar beet resulted in a 31% increase in labour productivity during singling. - L.K. [231(43)]

1396. HAUSER, E.W. and THOMPSON, J.T. (Agric.Exp.Sta.,Experiment,Ga,U.S.A.) Efficiency of selected herbicides and herbicidal mixtures for weed control in peanuts. Proc.13th annu.Meet.Sth.Weed Conf., 1960, 47-8.

Particularly promising results were given by 2,4-DES 1.5 + dinoseb 1.5 # and EPTC 5 + dinoseb 1.5 # applied at emergence. Simazine proved to be incompatible with dinoseb and caused nozzle blockage. - L.K. [O.W.]

1397. BURT, E.O. (Agric.Exp.Sta.,Gainesville,Florida,U.S.A.) Weed control in Florida field crops. Proc.Soil & Crop Sci. Soc.Fla, 1958, 18,224-7, bibl.3.

Includes the following information:- in peanuts dinoseb 9 # pre-em. gives good control of annuals and is superior to 2,4-DES which is more dependent on favourable environmental conditions and has given variable results. Dinoseb 3 # applied soon after emergence to germinating weeds gave 100% kill of annual weeds, caused only temporary scorching and stunting, and increased yields; the addition of 2,4-DES 2-4 # increased the residual effect up to 4-6 weeks. The following caused injury to peanuts when rainfall was high:- sodium PCP 8 and 12 #, 2,4-D (low volatile ester) 2 #, diuron 1 and 2 #, CDAA 8 and 12 #, 3Y9 2 and 4 #, CDEC 8 and 12 # and EPTC 5 and 10 #. When incorporated into the soil before planting, EPTC 1 and 2 # and the following 3 thiol carbamates gave very good weed control with little or no injury: ethyl allyl-n-propyl- and propyl ethyl-n-butyl- at 2 and 4 #, and n-propyl di-n-propyl- at 1 #.

In pastures Eupatorium capillifolium was killed by 2,4-D 1 # when under 1 ft high and growing rapidly whereas 4 # failed to kill mature plants. St. Augustine grass is the only pasture grass commonly grown in Florida which has been injured by 2,4-D at rates necessary to control broadleaf weeds. Two applications of disodium methyl arsonate 6 # controlled annual grasses in perennial grass pastures but injured St. Augustine grass and centipede grass. - D.M.L.S. [37(75.9)]

1398. UNITED STATES. (Amchem Products Inc.,Ambler,Penn.,U.S.A.) Experimental materials for 1960 tests. Mimeo.Publ. Amchem Products Inc., 1960, pp.11.

Satisfactory weed control in field or horticultural crops resulted from amiben (triethylamine salt) 2-4 # pre-em. in soybeans, amiben (10% acid on 24-48 mesh attaclay) pre-em. in crucifers, sweet potatoes, squash, pumpkins, ornamentals and as a lay-by treatment for tomatoes; Dinoben (2,5-dichloro-3-nitrobenzoic acid) liquid or granular 4-6 # on strawberries; fenac 2 # pre-em. in maize or 4 # followed by ploughing 10-14 days later or fenac 3 # in sugar cane; Amitrol-T [amitrol + ammonium thiocyanate] 4 # as pre-ploughing treatment for maize or 2 # pre-ploughing + cultivations post-em. Amiben (triethylamine) also showed promise as a pre-em. weed killer in squash, pumpkins, carrots, peanuts, seedling asparagus and safflower. Amitrol-T 1-2 # 200/gal in April controlled water hyacinth; Amitrol-T 5 # + MCPA 10 # or Amitrol-T 5 # + 2,4-D (amide) 10 # controlled alligator weed [Alternanthera philoxeroides]; Amitrol-T 4-5 # controlled cattails [Typha latifolia]. Amizine 7 # (1 # amitrol + 3 # simazine) gave good weed control in woody plant nurseries, forest plantations, etc., without damage to trees.

Recommendations are given for woody plant control with amitrol + 2,3,6-TBA (triethylamine salt) and invert emulsions of butoxyethanol esters of 2,4-D, 2,4,5-T or a 50:50 mixture of the two. - M.E.L. [O.W.]

1399. SMITH, R.J. (U.S.Dep.Agric., Stuttgart,Arkans.,U.S.A.) Effect of low rates of several phenoxyalkylcarboxylic acids on soybeans. (Abstract). Proc.13th annu.Meet.Sth.Weed Conf., 1960, 243-4.

In a 2-year study the amine salt and ester formulations of 2,4-D, 2,4,5-T, 2,4,5-TP and 2,4-DB at 0.01-0.25 # applied to soybeans 6-12 in. high, in the 5th trifoliate leaf stage, and during flowering (30-36 in. high) caused yield reductions at all stages but most at the

earliest stage. The order of toxicity, with the most toxic listed first, was:- 2,4,5-TP, 2,4,5-T, 2,4-D and 2,4-DB. There was little difference in response to the 2 formulations. - D.M.L.S. [O.W.]

1400. AVETISYAN, A.A. and STAMBOLTSYAN, K.M. [Influence of 2,4-dichlorophenoxybutyric acid on yield of esparcet, Onobrychis sativa (Onobrychis viciaefolia) and its effectiveness as changed by mineral fertilizers. Izvest.Akad.Nauk Armyan. S.S.R.,Biol.Nauki, 1959, 12,(7),45-51.
Treatment of esparcet with aqueous 0.005% solution of 2,4-dichlorophenoxybutyric acid produces increase in bean yield. Spraying proved most effective when accompanied by P + N fertilizing. - Chem.Abstr., 54,10215 g.

1401. HURST, H.R. and FRANS, R.E. (Agric.Exp.Sta.,Fayetteville,Arkans.,U.S.A.) Some preliminary effects of pre- and early post-emergence herbicides on alfalfa production. Proc.13th annu.Meet.Sth. Weed Conf., 1960, 39-46, tabs.3,bibl.3.
Dinoseb and/or chlorpropham, diuron, 2,4-DB + dalapon, dinoseb and MCPB applied in winter or spring post-em. did not increase lucerne yields, probably due to inadequate weed control. EPTC (granular) pre-planting 1 and 2 # or EPTC (liquid) pre-em. 4 # raised yields markedly and gave reasonable weed control while diuron and chlorpropham failed to control weeds or raise yields appreciably. - L.K. [O.W.]

1402. KERR, H.D. and KLINGMAN, D.L. (Agric.Exp.Sta.,Pullman,Washington,U.S.A.) Weed control in establishing birdsfoot trefoil. Weeds, 1960, 8,(2),157-67, figs.2,tabs.5,bibl.12.
A literature review and a more detailed account of Weed Abstr., 6,1298 are given in addition to (1) a handweeding study to evaluate the effects of several weed components on trefoil development, and (2) a test of the effect of dalapon on trefoil nodulation. (1) The initial stand averaged about 2 trefoil plants/ft^2 and this was maintained only on plots kept weed-free. When all weeds were removed, the number of stems/plant was 10 times that on plots which were not weeded, and the dry weight yield of trefoil was >500 times as much. If weed grasses were removed >12 times as many trefoil plants survived as on plots freed of broadleaf weeds. (2) Dalapon 6 # did not inhibit nodulation, and these rates were adequate for grass control. - J.W.F. [O.W.]

1403. SCHREIBER, M.M. (Dep.Bot.& Plant Path.,Purdue Univ.,Lafayette,Indiana,U.S.A.) Pre-emergence herbicides on alfalfa and birdsfoot trefoil. Weeds, 1960, 8,(2), 291-9, figs.3,tabs.8,bibl.12.
A brief review of work carried out between 1956 and 1958 on the use of pre-em. herbicides for weed control in forage legumes is given.
Neburon 1-4 # applied in early May gave effective control through June and July of annual broadleaf weeds and grasses without injuring lucerne (the main weeds being Chenopodium album, Amaranthus retroflexus, Polygonum persicaria, Ambrosia artemisiifolia, Fagopyrum spp. and Setaria lutescens). Reduction in weed competition in the early stages of lucerne establishment produced a greater % of more highly developed lucerne plants. Birdsfoot trefoil was susceptible to neburon at rates of >1 #, but significant yield increases over untreated control plots were found in the year after neburon treatment. Birdsfoot trefoil yield showed a greater increase than that of lucerne 1 year after neburon treatment.
EPTC 8 # as a surface application did not give satisfactory weed control, but did not injure either lucerne or birdsfoot trefoil. - J.W.F. [O.W.]

Noted

1404N. SMITH, R.J. (Rice Branch Exp.Sta., Stuttgart,Arkansas,U.S.A.) Chemical control of barnyardgrass in rice. Weeds, 1960, 8,(2), 256-67, figs.5,tabs.6,bibl.6.
A more detailed account of Weed Abstr., 8, 1209 is given. - J.W.F. [O.W.]

HORTICULTURAL, ORNAMENTAL AND PLANTATION CROPS

See also 1383,1394,1398,1484, 1485,1490,1491,1492,1539.

1405. UNITED STATES. Weed control in horticultural crops. [13 Reports] Abstr. Meet.Weed Soc.Amer., 1960, 10-16.
The following treatments gave good weed control without injury to the crops:-

strawberries - 2,4-DES + chlorpropham immediately pre- to 4 weeks post-planting, EPTC 5-10 # or CDEC 3-5 # 4 weeks post-planting and in early winter, simazine or neburon in early autumn at low rates; tomatoes - EPTC (liquid or granular), amiben, neburon and simazine (liquids) 10 days after transplanting and chlorpropham 4 weeks after transplanting; potatoes - EPTC 6 # pre-planting; celery - N-(3,4-dichlorophenyl)-2-methylpentanamide 4 # 2-4 weeks after transplanting or 1-3 # on seedlings, 0.5-6 # neburon or chlorpropham 4 # + Stoddard solvent 20 gal after transplanting; cabbage - CDAA + CDEC 1:1 4-6 # pre-em., neburon or simazine as autumn or split autumn-spring treatments; ornamentals - simazine or diuron at low rates pre-em. in autumn (tulip, iris and narcissus), simazine or diuron 2 # pre-em.+ PMA 1 # or 2,4-D (diethanolamine salt) 0.25 # post-em. (gladiolus). Weed control with crop damage resulted from: simazine 2 # to strawberries 1 month post-planting and at 0.5 # in celery; spray formulations of amiben, neburon or simazine on tomatoes 4 weeks after transplanting.

The following treatments injured Koethen sweet orange seedlings in greenhouse conditions:- polychlorobenzoic acids, 2,4-D or 2,4,5-T 0.125 p.p.m.; 2,4-D (alkanolamine salt) 0.25 p.p.m.; atrazine or dalapon 0.5 p.p.m.; diuron, fenuron, propazine or simazine 1.0 p.p.m.; EPTC, monuron or 2,4-DES 2.0 p.p.m.; trietazine or 2-methoxy-4,6-bis(ethylamino)-s-triazine 4.0 p.p.m.; amitrol 8.0 p.p.m.; neburon 16.0 p.p.m.; NPA or dinoseb 32 p.p.m.; chlorpropham or HCA 64 p.p.m. - M.E.L. [O.W.]

1406. UNITED STATES. Weeds in horticultural crops. [8 Reports] Res.Progr.Rep. West.Weed Control Conf., 1960, 31-8.

The following gave good weed (in brackets) control with no permanent damage to crops:- EPTC 3 # pre-planting in Kentucky Wonder Pole beans (80% Cyperus rotundus, 0% Portulaca oleracea); EPTC 3-6 # 7.5 weeks before planting out endive (C. rotundus, Solanum villosum); EPTC 3 # 7 days pre-planting White Rose potatoes (C. rotundus); diuron 3.2 # pre-em. in tulips (Polygonum pensylvanicum, P. aviculare, Chenopodium album, Stellaria media, Senecio vulgaris and Poa annua); diuron 1.5 #, NPA 4 #, CDEC 12 #, O-2,4-dichlorophenyl-O-methyl isopropylphosphoroamidothioate 10 # and methoxy-ipazine 1 # on chilli 12-14 in. high; R-1607 (propyl propylthiolcarbamate) 3 #, R-2061 (propyl ethylbutylthiolcarbamate) 3 # pre-planting in beans (90% or over of C. rotundus and P. oleracea), R-2060 (ethyl ethylbutylthiolcarbamate) 3 # pre-planting in beans (50% C. rotundus and P. oleracea) and EPTC 3 # pre-planting in maize at depth of 1 in. (C. esculentus and C. album). Good control of Oxalis cernua in citrus orchards was given by amitrol 2 #, 2,4,5-T (acid) 2 #; 2,4,5-T (butoxyethanol ester) 2.4 #, 2,4,5-TP (propyleneglycol butyl ether ester) 2.5 #, 2,4-D (acid) 3.2 # and 2,4-D (butoxyethanol ester) 2.5 # all in 100 gal. Under greenhouse conditions no visible injury 12 weeks after treatment of established plants was caused by endothal 32 p.p.m., 2-dimethylamino-1,4-naphthaquinone 128 p.p.m., 2-diethylamino-1,4-naphthaquinone 64 p.p.m., 2-isopropylamino-1,4-naphthaquinone 0.5 p.p.m., R-1607 16 p.p.m., R-2061 64 p.p.m. on Koethen sweet orange seedlings; 2,4,5-TP 0.25 p.p.m., 2,4,5-T 0.125 p.p.m. and 2,4-DA [2,4-D?] 1 p.p.m. in Duke avocado seedlings; trietazine 1 p.p.m. on Manzanella olive seedlings and TCA 1 p.p.m. on Topa Topa peaches (5 weeks experiment); higher rates of these herbicides injured the plants. Under greenhouse conditions the following treatments injured the plants:- polychlorobenzoic acids 0.125 p.p.m. on avocados; atrazine 0.5 p.p.m. on olives or peaches; amitrol, propazine, simazine, trietazine and dalapon all at 0.5 p.p.m. on peaches.

The following triazines damaged the crops: simazine 4 # pre-em. in tulips; 2-methoxy-4-methylamino-s-triazine, 2-methoxy-4-ethylamino-s-triazine and 2-chloro-4-methylamino-s-triazine, ipazine, atrazine and 2-methoxy-4,6-bis(ethylamino)-s-triazine 1 # in chilli 12-14 in. high and ipazine 2 # in chilli.

Neither weeds nor crops were susceptible to N-(3,4-dichlorophenyl)methacrylamide 6 # in chile 12-14 in. high and simazine (granular) 2 #, monuron-borate (granular) 25 #, or chlorpropham 4 # + dinoseb 4.5 # pre-em. in tulips. - M.E.L. [O.W.]

1407. MENGES, R.M. (U.S.Dep.Agric.,Walasco, Texas,U.S.A.) Pre-emergence chemical weed control in spinach. (Abstract) Proc.13th annu.Meet.Sth.Weed Conf., 1960, 67-8.

When applied to a hot, dry seedbed the same day as sowing spinach and irrigating after 10 days, 6 # CDT (2-chloro-4,6-bis(diethylamino)-s-triazine) controlled weeds without crop injury; CDT 3 + chlorpropham 3 # or + CDEC 4 # also caused no crop injury. CDEC caused no taint to spinach, whereas diuron did. In another trial CDEC 6 or 8 # or CDEC 4 + diuron 0.33 # gave very promising results. A residual pre-em. application of CDT 6 # controlled Chenopodium murale.- L.K. [O.W.]

1408. ORSENIGO, J.R. (Everglades Exp.Sta., Belle Glade,Fla.,U.S.A.) The performance of amiben and dinoben granules in weeding several transplant crops on organic soil. Proc.13th annu.Meet.Sth.Weed Conf., 1960, 71-7, tabs.3.

Amiben (granular) 3-7 # or amiben (triethylamine, liquid) 3 # and Dinoben (3-nitro-2,5-dichlorobenzoic acid) (granular) 3-7 # were applied on a peaty muck soil 1 or 2 days after transplanting to Waltham broccoli, Badger Market cabbage, Imp.Super Snowball cauliflower, Great Lakes lettuce and Rutgers tomato all ca. 6 in. tall, to Black Beauty eggplant and Florida Giant pepper up to 2 in. tall and Emerald celery trimmed to 10 in. (3-4 petioles). The main weeds were Digitaria spp., Amaranthus spinosus, Portulaca oleracea and Eleusine indica. The liquid formulation of amiben was rather more effective than the granular and both were more active than Dinoben. Liquid amiben gave 84% control of grass weeds, 59% control of Portulaca and 66% control of Amaranthus. The compounds were less active than formerly, presumably due to dry conditions. Early yields, taken before late intense rain injured the crops, showed that there was no significant effect on the stand or yield of cabbage, lettuce or tomatoes (tomatoes, however, did appear to be somewhat susceptible). - L.K. [O.W.]

1409. ORSENIGO, J.R. (Everglades Exp.Sta., Belle Glade,Fla.,U.S.A.) Celery herbicide investigations on organic soil: a resume. Proc.13th annu.Meet.Sth.Weed Conf., 1960, 78-82, bibl.6.

Particularly promising results have been given by Karsil (N-(3,4-dichlorophenyl)-2-methylpentanamide) 1 # in seedbeds at the 2-4 leaf stage (earlier application has caused somewhat more injury) and post-transplanting. Weeds controlled include Acnida cannabina, Amaranthus spinosus, Ambrosia spp., Chenopodium album, Cyperus sp., Digitaria sp., Eclipta alba, Eleusine indica, Eupatorium sp., Galinsoga ciliaris, Galium sp., Gnaphalium spathulatum, Parietaria floridiana, Portulaca oleracea and Rorippa sp. Post-transplanting good results have also been given by CDEC, CDAA, chlorpropham, EPTC, propazine and CDEC + CDAA or + chlorpropham. For the control of emerged weeds after transplanting, mineral oil ± CDEC or ± chlorpropham has given good results and especially Karsil; the addition of CDEC to Karsil has improved residual control. - L.K. [O.W.]

1410. MENGES, R.M. (U.S.Dep.Agric.,Welasco, Texas,U.S.A.) Influence of irrigation methods on performance of pre-emergence herbicide treatments. (Abstract) Proc.13th annu.Meet. Sth.Weed Conf., 1960, 69-70.

Chlorpropham, CDEC and EPTC were all more effective when followed by overhead, rather than furrow, irrigation. This appeared to be due to moving deeper into the soil. Diuron was not affected by the method of irrigation. - L.K. [O.W.]

1411. UNITED STATES. Weed control in turf. [8 Reports] Abstr.Meet.Weed Soc.Amer., 1960, 48-51.

Amine methyl arsonate 0.5 to 3 lb in 5 gal water/1000 ft^2 + detergent resulted in 65-75% reduction of Cyperus rotundus in Cynodon dactylon turf, causing only temporary discolouration of the turf.

Three applications of octyl ammonium methylarsonate 8% + dodecyl ammonium methylarsonate 8% (AMA) at 94 ml or of disodium methylarsonate 44% (DMA) at 30 g gave equally good control of Paspalum dilatatum and Digitaria sanguinalis; 2 or 3 applications were necessary for control of Paspalum notatum; Sporobolus poiretti was not affected by any of these treatments; the Cynodon dactylon turf was only temporarily discoloured.

Satisfactory control of Digitaria sanguinalis, D. ischaemum, Eleusine indica and Setaria sp. was obtained with pre-em. granular diphenylacetonitrile and (p-chlorophenyl)phenylacetonitrile 32 #, the former being the more effective. No damage to Poa pratensis, and only slight temporary chlorosis of Agrostis sp. occurred with this rate. Pre-em. rates < 16 # and all post-em. rates were unsatisfactory.

Simazine 2 to 4 # pre-em. for annual weed control, and 2,4-DB 1 to 2 # post-em. for young broadleaf weeds are satisfactory for use in the following turf grass species: Stenotaphrum secundatum, Cynodon dactylon, Paspalum spp. Axonopus compressus, Zoisia spp., Eremochloa ophiuroides. Dichondra spp. are susceptible to injury from the use of simazine. Stenotaphrum secundatum may be injured by 2,4-D, 2,4,5-T and disodium monomethylarsonate, and Eremochloa ophiuroides by the latter herbicide.

Discolouration of Rumex acetosella was caused by (1) 2,4-D (propylene glycol butyl ether ester) 2 #, (2) 2,4,5-TP 2 #, (3) PBA 4 #, (4) 2,4,5-T (propylene glycol butyl ether ester) 2 #, (5) 2,4-D 1.5 # + 2,4,5-TP 1.5 #, and (6) 2,3,6-TBA (sodium) 2 # (all applied in 5 gal water/1000 ft^2; the plants treated with (3) turned brown and were dead 10 days after treatment. Best control was obtained

by using (3) or (6), while (4) was the least effective. Slight discolouration of Poa pratensis, Festuca rubra and Zoisia sp. was caused by (6), and slight to medium discolouration by (3). - J.W.F. [O.W.]

1412. FLEMING, S.D. (Chesterford Park Res.Sta.,Saffron Walden,Essex,England). Herbicides and sisal cultivation. 2 - The economic benefit to the grower. World Crops, 1960, 12,(7),267-70, figs.6.
Includes the information that simazine or atrazine 2 # a.i. in at least 50 gal water/ac can give up to 5 months control of annual grasses and broadleaf weeds applied [implicitly] at planting time in sisal. - L.K. [O.W.]

1413. GREAT BRITAIN. Rep.Edinb.Coll. Agric., 1958.
p.96. Malling Jewel raspberries have proved susceptible to spring applications of dalapon. - D.M.L.S. [O.RE.]

1414. COMELLI, A. Les cultures fruitieres subtropicales en Israël. IV. Le Palmier dattier en Israël. [Subtropical fruit crops in Israel. IV. The date palm in Israel.] Fruits, 1960, 15,(5),223-31, (F.), figs.4, tabs.1.
Weed control is maintained by oils in winter and a cover crop in summer. - D.M.L.S. [O.W.]

1415. KRETCHMAN, D.W. (Citrus Exp.Sta., Lake Alfred,Fla.,U.S.A.) Controlling weeds and brush in citrus grove ditches. Proc. 13th annu.Meet.Sth.Weed Conf., 1960, 53-61, tabs.2,bibl.2.
Jussiaea peruviana, J. angustifolia and J. scabra growing on ditchbanks were well controlled for 12 months by August applications of diuron pellets 20 # (1), monuron 20 # (2) and monuron - TCA granular 22 # (3); good control for 6 months was given by 2,4-D (dimethylamine) 4 # (4), 2,4,5-T (triethylamine) 4 # (5) or a mixture of 2 # each of (4)&(5). Amitrol 10 # and sodium arsenite (48 # As2O3) were ineffective. In another trial 2 applications of dalapon 5.55 # 10 days apart alone or + each of the following: fenuron 20 #, monuron 20 #, monuron - TCA 22 #, 2,4-D (dimethylamine) 4 #, 2,4,5-T (triethylamine) 4 # and 2,4,5-TP (ester) 4 # were applied in November for the control of J. peruviana, Schinus terebinthifolius, Psidium guajava Baccharis halimifolia, Lantana camara, Ricinus communis, Vitis rotundifolia, Panicum purpurascens and Hyperhaemia rufa. At least 75% control of these spp. 12 months after application was given by fenuron + dalapon and this was much the best treatment, although the % weed free area was somewhat less than for diuron + dalapon. No treatment injured citrus trees growing 30 ft from the edge of treated plots. Ditchbank erosion occurred on plots treated with diuron 20 #. - L.K. [O.W.]

1416. KRETCHMAN, D.W. (Fla.Citrus Sta., Lake Alfred,Fla.,U.S.A.) Control of annual weeds in non-bearing citrus groves. Proc. 13th annu.Meet.Sth.Weed Conf., 1960, 62-6, tabs.1,bibl.3.
In 1958 diuron, simazine, atrazine, trietazine, propazine, EPTC 20 and 40 #, chlorpropham 6 and 12 # and CDAA 10 and 20 # were applied as directed sprays under 10 or 16 year old pineapple orange trees on rough lemon stock and seedlings of rough lemon, sour orange and sweet orange transplanted into the plots 6 weeks prior to treatment and growing in a fine sandy soil. In 1959 3 year old Valencia oranges were treated with diuron 4 and 8 #, atrazine 5 and 10 #, trietazine and propazine 10 #, EPTC, CDAA and chlorpropham 6 #, dinoseb (amines) 12 #, Zytron (O-2,4-dichlorophenyl-O-methylisopropylphosphoroamidothioate) 20 #, Karsil (N-(3,4-dichlorophenyl)-2-methylpentanamide) and Dicryl (N-(3,4-dichlorophenyl)-methacrylamide) 10 #. The only compounds to cause any crop injury were atrazine and diuron. The main weed was Digitaria sanguinalis and all compounds except Karsil and Dicryl gave good initial control - the best control after 6 months (85-88%) was given by simazine 5 and 10 #. - L.K. [O.W.]

1417. SILKER, T.H. (For.Serv.,Kirbyville,Texas,U.S.A.) Preliminary chemical weed control tests in a Southern pine nursery. Proc. 13th annu.Meet.Sth.Weed Conf., 1960, 83-8, tabs.4.
In pre-planting tests Vapam [SMDC] 100 gal/ac gave better control of Bermuda grass [Cynodon dactylon] than MC-2 [methyl bromide] 435 #, Shell AA [allyl alcohol] 72.5 gal/ac, Shell DD [dichloropropane + dichloropropene] 25 gal/ac, Mylone [DMTT] 544 #, Simazine 50 W 4 # or Telone [chlorinated hydrocarbons] 40 gal/ac. In pre-em. tests in pine band applications of Dow General Weedkiller [55% dinoseb] 3 pints/ac gave better initial control of

Cyperus spp., Ambrosia spp., Gnaphalium spp., Oenerin sp. and other weeds than Simazine 50 W 1-4 #, chlorpropham 8 #, EPTC 2-6 # or Dow Premerge [dinoseb (amines)] - no treatment injured pines. In post-em. tests oils gave better control of the above weeds than Fasco Flame [PCP], amitrol 1 and 2 #, simazine 3 + amitrol 2 # or G56 in oil. 2,4-DB 2 + dalapon 5-7# post-em. gave appreciable injury to Israel sweet clover, while 2 + 3 # did not, nor did dalapon alone 3 or 7 #, Dow Premerge 2 qt/ac or 2,4-DB 2 # alone. - L.K. [O.W.]

Noted

1418N. WALLIS, J.A.N. (Coffee Res.Sta., Ruiru,Kenya,Africa). Grass control in Kenya coffee. Down to Earth, 1960, 16, (1),7-9, figs.2.
See Weed Abstr., 8,1845. [O.W.]

BIOLOGY OF WEEDS AND POISONING BY WEEDS

1419. BAGGINI, A., MIRADOLI-ZATTI, M., PAVAN, M. and VALCURONE, M.L. (Univ. Pavia,Italy). Effects of cantharidin and norcantharidin on mitosis in Allium cepa. Bull.soc.med.chir.Pavia, 1958, 72,39-43.
Cantharidin completely blocked the root development; the effect of norcantharidin was partial. - Chem.Abstr., 54,5841 c.

1420. CHRISTIAEN, C. Le parasitisme chez les plantes. [Parasitism in plants.] Armand Colin, 1960, pp.211, (F.), figs.42.
A study of the various types of parasitic plants with a special chapter on the structure and mechanisms of penetration.- From C.R.Acad.Agric.,France, 46,(7),368-9. D.M.L.S.

1421. ANDERSON, R.L. and KAUFERT, F.H. (For.Exp.Sta.,St.Paul,Minn.,U.S.A.) Brooming response of black spruce to dwarf mistletoe infection. For.Sci., 1959, 5, (4),356-64, figs.5,bibl.14.
The results of a study in 1947-8 are discussed and other writers' investigations reviewed. - D.M.L.S. [O.F.]

1422. GUINET, P. Essai d'identification des graines de chenopods commensaux des cultures ou cultivés en France. [An attempt to identify the seeds of Chenopodium spp., either cultivated or weeds of crops, in France.] J.Agric.trop. et Bot.appl., 1959, 6,(6/7),241-66, figs., bibl.11.

1423. DOYON, D. (Inf. & Res.Serv.,Min.Agric., Quebec,Canada). Les aires geographiques actuelle et primitive d'Asclepias syriaca L. en Amerique. [The present and the primitive geographical distribution of A. syriaca L. in America.] Rep.Soc.Quebec Protection Plants, 1959, 41,43-68, (F.f.), figs.2,bibl.234.
Its distribution in 6 Canadian provinces and in 36 states of the U.S.A. is detailed. - D.M.L.S. [O.W.]

1424. AL-ANSARY, M.M. (Univ.,Wisconsin,U.S.A.) Variation in seed and seedling characters of bromegrass, Bromus inermis, Leyss., in relation to environment. Ph.D.Thesis, Univ.Wisconsin, 1960, pp.113, Microfilm $2.50, Xerox $5.60.
Using 5 varieties, 1 synthetic and 65 individual plant progenies, trials were carried out in the greenhouse; 6 soils, 3 seeding depths, and 2 levels of moisture and nitrogen were tested. The trials indicated that soil type, seeding depth, soil moisture and nitrogen all affect seedling stand and early vigour, but the first 2 treatments caused significant variations only when other factors were limiting; varietal performance might be expected to be similar under widely varying soil, nitrogen and moisture conditions. Seed viability, seed care and age, seedling diseases and soil temperature were all found to affect stand and vigour.
Correlations among 50 individual plant progeny characteristics were investigated. Vigour was correlated with seed weight for each soil at each depth and at both levels of nitrogen. Stand was correlated with vigour in some soils and at some seeding depths. No significant correlations were obtained between seed weight and blotter germination or stand, and between blotter germination and stand or vigour. Seed weight, stand and vigour were independent of the nature and intensity of mother plant diseases.
The 15 plant progenies selected and the synthetic variety were superior in germination and seedling vigour to the 5 commercial varieties tested, indicating improvement in seedling stand and vigour through breeding. - From Diss.Abstr., 20,3913. - J.W.F.

1425. HOLZ, W. and KUCHER, W. [Pflanzenschutzamt, Klagenfurt, Austria]. Über den Alkaloidgehalt in Bunkern [Solanum nigrum L.]. [The alkaloid content of Bittersweet (Solanum nigrum L.)]. Nachr. Bl. Deut. Pflanzenschutzdienst, 1959, 13(11), 83-87, (Ger.), figs.1, tabs.2, bibl.1.
The alkaloid content of the shoots of S. nigrum showed wide variation between samplings even over a period of 2 days and between sites and between years. The alkaloid content of the shoots tended to increase with their age. Frost caused a decrease in alkaloid content and shoots killed by frost were free of alkaloid. - Mainly from Author's Summary. - L.K. [O.W.]

1426. UNITED STATES. Public health aspects of weed control. [5 Reports.] Abstr. West. Weed Soc. Amer., 1960, 52-3.
Includes reports on (1) a study of smart period, weather effects on air-borne ragweed pollen concentrations, and (2) the Oregon ragweed control programme. - D.M.L.S. [O.W.]

1427. PUNGOTTI, F. (Ist.Bot.,Univ.,Padova, Italy). Sulla vegetazione infestante le colture sarchiate in Val di Sole. [On the weeds in hoed crops in Val di Sole.] Nuovo G.Bot.Ital., 1959, 66,(1-2),244-5.
Contains a list of 51 weeds with the % of their presence in 30 weed counts made in 1957-8 in potato crops. - D.M.L.S. [O.W.]

1428. * HIYAMORO, S. Studies on the improvement of Sasa grassland vegetation through application of sodium chlorate. I. Plant succession and improvement effects. Bull. Exp. Sec.Herb.,Crops & Grassland Farming, 1958, 4,(1/2),23-6, (Jap.).

1429. * CHIERSI, R. [Bot.Inst.,P.O.Box 155, Pavia,Italy]. Evoluzione della vegetazione infestante nelle risaie pavesi. [Evolution of weeds in the Pavian rice fields.] Riso, 1958, 5,(5),15-18, (It.)

1430. GODBOLE, S.R. Some poisonous plants of the old Bombay State. Poona agric.Coll. Mag., 1959, 51,(2),51-4, tabs.1.
Contains a list of 51 plants, giving botanical and vernacular names, the part containing poison, the poisonous principal, and the effect on man or animals. - D.M.L.S. [23(54)]

ANNUAL AND BIENNIAL WEEDS
[OF OTHER LANDS]

See also 1391, 1392, 1415, 1486, 1492, 1496, 1534.

1431. [illegible], C.J. and WILLIAMS, R.C. [Dow Chem.Co.,Lake Jackson,Texas,U.S.A.] Observations on the influence of dissolved [illegible] on the effectiveness of [illegible] herbicides on [illegible] aquatic weeds. Proc. 13th annu. Conf. Calif. Weed Conf., 1960, 221-2, tabs.4.
In greenhouse tank experiments, using coontail [Ceratophyllum demersum] as the test plant, the addition of calcium as $CaCl_2$ enhanced the activity of Silvex [2,4,5-TP] and appeared also to enhance that of 2,4-D. However, the effect of Ca was not differentiated from a possible effect of Cl. 2,4,5-TP was more effective than 2,4-D on C. demersum. - D.M.L.S. [O.W.]

1432. BROUSHUT, G.S. and WILLIAMS, R.C. [Dow Chem.Co.,Lake Jackson,Texas,U.S.A.] Water pH and its effect on the action of [illegible] herbicides. Proc. 13th annu. Conf. Calif. Weed Conf., 1960, 218-20, tabs.2, bibl.1.
Under greenhouse conditions, using Ceratophyllum demersum as a test plant, the kill obtained with Silvex [2,4,5-TP] was 100% in water of pH 5, 80% for pH 7, and only 30% for pH 9. Under more variable natural conditions in 3 lakes, the effect on various aquatic plants of both 2,4-D and 2,4,5-TP in waters of pH 5.5 was much greater than in pH 9, but about the same as that in pH 7.0. - D.M.L.S. [O.W.]

1433. UNITED STATES. The control of annual and perennial weeds. [11 Reports.] Abstr.West.Weed Soc.Amer., 1960, 54-9.
Two of the 3 copper containing antifouling paints tested for algae control on concrete in static or flowing water were satisfactory; both paints had a high initial leaching rate which levelled off to a near-constant rate after 6 weeks.
Reduction in submersed aquatic plant growth due to light scattering by field sediment (naturally occurring bentonite-type sediment) 50 p.p.m. was 32% and at 1250 p.p.m. 90%; higher concentrations caused no further reductions. 3-3.5 times concentration of commercial sediment (sodium-base

monohydrate-type herbicide) were required to produce the same growth reductions. Good control of cattails [Typha latifolia] was given by dalapon 5 %, a.e. + amitrol 2 %, a.e. during flowering and early fruiting (the most economical treatment), or amitrol 5 %, a.e. or equal applications of the following: 2,4-D (isopropyl ester) 3.3-5 %, a.e. in oil (multiple treatments), dalapon 20 %, a.e. or 10 %, a.e. + 2 %, a.e. 1 month later, amitrol 10 % (dry) or 6 % (liquid) or dual applications 1 month apart at 1.5 % (liquid); dalapon 5 %, a.e. + amitrol 3 %, a.e.

Experiments on Potamogeton foliosus in standing aquaria showed that the increase in fresh weight over 4 weeks (expressed as % growth in full sunlight) was 100, 64, 37, 27, 7 under the following light intensities (as % full sunlight) respectively - 100, 20, 5.6, 1.0, 2.5.

2,4,5-TP 2 p.p.m. controlled Spirogyra sp., Cladophora sp. and Anabaena spp. without injury to plantain or vallis grass; in some cases flies were killed. The life history of Potamogeton pectinatus is discussed. - [illegible] [C.W.]

1434. [illegible] [illegible]. Aquatic and ditch bank weeds. [12 Reports] Rec.Proj.Rep. Western Weed Control Conf., 1960, 55-60, [illegible].

Emergent aquatic weeds. The results of granular herbicides applied in May on Ludwigia stolonifera were:- 2,4,5-TP (isooctyl ester) 2-40 %, 2,4-D (isooctyl ester) 40 % and simazine 20 % - 95% control or over for 6 months; polychlorinated benzoic acids salts of benzoic acids - control for 2 months, fenuron 20 % and Urea or iodine borate-urea complex - no control. Effective control of Typha latifolia 1 year after treatment was given by dalapon (sodium or diethylene glycol diester) 20 %, amitrol (liquid or powder) 12-20 %, 2,4-D 6 % in diesel oil 10 gal + emulsifier 0.4 gal, and to a lesser extent by erbon 40 %. Initial suppression by dalapon was greater than by amitrol; the most effective treatments were (i) single late-season rather than split early-late season, (ii) after formation of inflorescence.

Submerged aquatic weeds. Single applications of copper sulphate 0.25 lb/ft³/sec killed algae over a distance of 10 miles in a canal of 5000 ft³/sec capacity. Applications over a 3 year period reduced Potamogeton and Zannichellia spp. known as 'pondweed' to 'treatments in November 1957 and April 1958 in a canal bottom between irrigation seasons had no effect on Potamogeton pectinatus during 1959. In irrigation canals the (a) average annual cost of weed control - mainly C. pectinatus and (b) time taken in man hours required was:- simazine 2 gal/ft³/sec (a) 1.5, (b) 5.8; alkyl 8.5-10 gal (a) 1.8, (b) 5.3; alkyl aryl methyl trimethyl ammonium chloride 4 gal (a) 1.4, (b) 3.; N-alkyl dimethyl, dimethylbenzyl ammonium chloride 4 gal (a) 1.0, (b) 4.3; alkyl quinolinium chloride 4 gal (a) 0.6. No adverse effects on cotton plants 10-12 in. or 24 in. tall, or reduction of yields was caused by 2 irrigations containing simazine 100 p.p.m.

Dump waste. The dry weight (g) of Cynodon dactylon 1 year after spraying was: 2,3,6-TBA 0.7, 0.0; polychlorinated benzoic acids (PBA) granular 15 %, 0.0, PBA water soluble 15 %, 19.7; PBA oil soluble 15 %, 46.3; 2,4-D (butoxyethanol ester) 4 %, 10.7 and unwashed, 240.3. Spring applications of MB 5 %, Gesfox (dalapon ester + 2,4,5-TP, 6 gal/ac, amitrol 4 % and dalapon 12-16 %) were promising for the control in summer of quackgrass (Agropyron repens), Kentucky bluegrass (Poa pratensis) and Ulmus pumila. Cynodon dactylon or Cynodon [illegible] grown following 3 treatments per growing season by weed oil (50% aromatic) 100-120 gal/ac > diquat 2-4 % or weed oil 100 g + PCP 1-2 %.

Grass control on road systems. The control of Bermuda grass (Cynodon dactylon) prior to asphalt surfacing, by borate + sodium chlorate 25% , or borate-MA complex 66.7 % > borax 25% , borate + urea 37% , MA 100 %, dalapon 34.1 % or sodium chlorate 43% ; simazine 17.4 %, urea 17.4 , and 2,3,6-TBA 17.4 % were ineffective. Water, at 0.5 in. prior to surfacing increased the effectiveness of weed treatments. MA 4-6 % gave control of grass on roadsides for 12 weeks. - K.G.L. [C.W.]

1435. CARTELL, L.E. Mist blower - tree injector combination for hardwood control. Proc.10th Ann.Meet.Sth.Weed Conf., 1960, 177-81.

Spraying of brush over 1-holly pine seedlings with 2,4,5-T by mist blower stem-killed about 10% of the brush with minimum resprouting and defoliated trees up to 35 ft; however, 2 % killed the pine seedlings and also natural pine 10-20 ft high. It has been decided to use the mist blower only for brush where there are no pine seedlings and to use the tree injector on adequately stocked areas of natural pine seedlings or sapling seeding release or on planted pine overtopped only by hardwoods. - D.L.L.3. [C.W.]

1436. SEELBACH, E. Portable mist blowers for chemical brush control. Proc. 13th annu. Meet. Sth. Weed Conf., 1960, 173-6.
A brief account of their use from 1955-9. Two models found satisfactory are the Kiekens Dekker KWH-75 Knapsack Mist Blower (Dutch) and the Fontan (German). - D.M.L.S. [O.W.]

1437. STARR, J.W. (State Coll., Univ. Miss., U.S.A.) The use of the mist blower for control of understory hardwoods. Proc. 13th annu. Meet. Sth. Weed Conf., 1960, 167-72, tabs. 7.
An interim report of results of June 1959 and January 1960 treatments with the acid, amine and esters of 2,4,5-T in oil, water, or oil-water mixtures or as an invert emulsion on the following spp.:- pine [Pinus spp.], red and white oaks [Quercus borealis] and Q. alba], hickory [Carya spp.], sweet gum [Liquidambar styraciflua], [Nyssa sylvatica], maple [Acer sp.] and persimmon [Diospyros virginiana]. Preliminary observation indicated (1) that the amines were less effective than the esters or acids; (2) 4 # does not give enough increase in kill over that from 2 # to justify the higher rate; (3) no marked difference in pine damage resulted from oil as carrier instead of water or oil-water mixture; (4) a total volume of 5 gal/ac was no more effective than 3 gal/ac. - D.M.L.S. [O.W.]

1438. GATTIS, J.L. and MANN, R.A. (T.V. Authority, Chattanooga, Tennessee, U.S.A.) Use of helicopter for chemical brush control by Tennessee Valley Authority. Proc. 13th annu. Meet. Sth. Weed Conf., 1960, 100-4.
A general account. In 1958 helicopter spraying in July with 2,4,5-T (esters) 4 # in 4 gal oil or water gave good control of black gum [Nyssa sylvatica], tulip poplar [Thespesia populnea?], black locust [Robinia pseudoacacia], wild cherry [Prunus sp.], sassafras [Sassafras albidum], sumac [Rhus copallina] and persimmon [Diospyros virginiana]; fair control of chestnut oak [Q. prinus] and redbud [Cercis canadensis]; and poor control of maple [Acer sp.], sourwood [Oxydendrum arboreum], pine [Pinus sp.] and cedar [Cedrus sp.]. - D.M.L.S. [O.W.]

1439. ANDREWS, H. and RICHARDS, R.F. (Univ. Agric. Exp. Sta., Tennessee, U.S.A.) Brush control with the substituted ureas. Proc. 13th annu. Meet. Sth. Weed Conf., 1960, 105-8, figs. 1, tabs. 1, bibl. 2.
Monuron applied as a dust in March to woody spp. on a Hartsells loam soil at 40 # gave 100% control of black oak [Quercus velutina], blackjack oak [Q. marylandica] and post oak [Q. stellata], 85% control of sourwood [Oxydendrum arboreum] 50% of sumac [Rhus sp.], 25% of hickory [Carya sp.] and no control of red maple [Acer rubrum]. 24 # was less effective except against white oak [Q. alba] which it controlled 100% (and 12 # 75%) and gave no control of sassafras [Sassafras albidum]. On a fine sandy loam monuron, diuron and fenuron applied in September as dusts at 4, 8 and 12 # were seen after 2 years to be ineffectual against species composed predominantly of black locust [Robinia pseudoacacia], black gum [Liquidambar styraciflua], Carya sp., Quercus sp., O. arboreum, persimmon [Diospyros virginiana], Rhus sp. and maple Acer spp. - D.M.L.S. [O.W.]

1440. GONZALEZ, F.E. (E.I. du Pont de Nemours & Co.) Industrial brush control with fenuron pellets. (Abstract). Proc. 13th annu. Meet. Sth. Weed Conf., 1960, 89-90.
The rapidity of root-kill by fenuron pellets of brush species on sandy soils was > on heavy soils and by spot > broadcast treatments. Temporary reduction in the ground vegetation cover resulted from broadcast but not spot treatments. Treatments at any time of the year were effective. More than 90% root kill of all species was found by the end of the second growing season. The more susceptible species, e.g. hackberry [Celtis sp.], black locust [Robinia pseudoacacia], elm [Ulmus sp.], pine [Pinus spp.], red maple [Acer rubrum] sweet gum [Liquidambar styraciflua] and oak [Quercus spp.] usually show chlorosis and defoliation within 30-60 days while the less susceptible spp. e.g. chinaberry [Melia azederach], sourwood [Oxydendrum arboreum], ash [Fraxinus sp.], tulip poplar, bay and walnut [Juglans sp.] may not reach maximum kill for 2 years after treatment. [O.W.]

1441. DARROW, R.A. (Agric. Exp. Sta., Coll. Sta., Texas, U.S.A.) Pelletized and granular herbicide tests for woody plant control. Proc. 13th annu. Meet. Sth. Weed Conf., 1960, 118-20, bibl. 1.
The influence of rainfall and soil texture on the effect of fenuron pellet application for the control of post and blackjack oaks [Quercus stellata and marylandica] is discusses and some results quoted. Under favourable moisture conditions 3-6 # in spring or early summer gave only partial control of yaupon [Ilex vomitoria] whereas monuron 6 # has occasionally given 80-90%

rootkill on fine sandy loams. Both fenuron 3 # and monuron 6 # applied in late spring gave good top growth control but only limited root kill of huisache [Acacia farnesiana]; January treatments were ineffectual. On limestone soils fenuron 6 # has controlled live oak [Q. virginiana] and Vasey shinoak [Q. undulata] and on a sandy soil has shown 60-70% rootkill of running or shinnery liveoak [Q. virginiana?] but 4 # was ineffectual. Preliminary tests indicate that 2 or 3 tablespoons/plant may be needed to control Diospyros texana. 2,3,5-TBA (granular) 8-9 # applied in the dormant season has caused growth inhibition and partial kill of Q. stellata and Q. marylandica but is much less effective when applied during spring or early summer; 4-8 # has given partial kills of I. vomitoria and winged elm [Ulmus alata]; rates up to 9 # have been ineffectual against Q. undulata, Q. virginiana and running live oak; 4 # caused 80-85% defoliation of red berry juniper [Juniperus sp.] 1 year after treatment. Small plants of Ashe juniper [Juniperus sp.] have been controlled by 1-2 oz/plant and small plants of Macartney rose [Rosa bracteata] by 1 or 2 tablespoons/plant applied in mid-winter, but broadcast applications on mowed roses have been effective only at 8-9 #. - D.M.L.S. [O.W.]

1442. GOODRICH, T.K. (Hiwassee Land Co., Calhoun,Tennessee,U.S.A.) Some observations on aerial spraying for pine release in East Tennessee. Proc.13th annu.Meet.Sth.Weed Conf., 1960, 151-6.

With particular reference to work organisation. - L.K. [O.W.]

1443. MILLER, S.R. (Union Bag-Camp Paper Corp.,Franklin,Va,U.S.A.) Summary of three years experience in large-scale applications of 2,4,5-T for hardwood control in the southeast. Proc.13th annu.Meet.Sth.Weed Conf., 1960, 157-65.

Three years work has indicated that foliar application of 2,4,5-T is not a reliable means of releasing pines. Species intermediate in resistance to 2,4,5-T include wax myrtle [Myrica cerifera]; resistant spp. include gallberry [Ilex coriacea]. - L.K. [O.W.]

1444. KNIGHT, V.J. (Coosa River Newsprint Co.,Coosa Pines,Ala.,U.S.A.) Some one-year results of several basal-applied herbicides on selected hardwood species. Proc. 13th annu.Meet.Sth.Weed Conf., 1960, 194-9, tabs.2.

The butoxyethanol ester of 2,4,5-T in diesel oil, oil/water emulsion or the invert emulsion, the iso-octyl ester in diesel oil, the propyleneglycol butyl ether ester in diesel(1), the pentyl ester in diesel, the emulsifiable acid in oil/water emulsion, the amine in diesel, the butoxyethanol esters of 2,4,5-T + 2,4-D in diesel, 2,4,5-TP in diesel and benzoic amine and emulsifiable acid in diesel were all applied as basal bark treatments to Carya spp., Quercus montana, Q. falcata, Q. borealis maxima and Q. marylandica of 0.25-2.5 in. d.b.h. in July-August. No single treatment was best on all spp., but (1) was best and gave 84% kill with no sprouts. The smaller trees were killed most easily. Oil solutions were better than emulsions. 5% 2,4,5-T gave better results than 2%, but the author considers that 3% may be satisfactory. - Partly from Author's Summary. - L.K. [O.W.]

1445. BOX, B.H. and BURNS, P.Y. (For. School,State Univ.,Baton Rouge,La,U.S.A.) Results of aerial spraying for pine release in western Louisiana. Proc.13th annu. Meet.Sth.Weed Conf., 1960, 141-50, tabs.11, bibl.4.

In trials with 2,4,5-T (ester and amine) + 2,4-D, spraying in late May was more effective for hardwood control than in April, or late September. The best results were given by 2,4,5-T (propylene glycol butyl ether ester) 2 # in oil-water which (from May application) gave 100% control of Quercus marylandica and Carya tomentosa, 90% control of Q. stellata, 80% of Q. falcata and 40 and 50% control respectively of Fraxinus americana and Liquidambar styraciflua but no control of hackberry [Celtis sp.] or Q. nigra; it did not injure loblolly pine. 2,4,5-TP (propylene glycol butyl ether ester) 2 # in oil-water emulsion applied in May gave 100% control of L. styraciflua and C. tomentosa without injuring loblolly but it also was ineffectual against Q. nigra. The triethylamine salt of 2,4,5-T was less effective than the ester. - D.M.L.S. [O.W.]

1446. SILKER, T.H. and DARROW, R.A. (For. Serv.,Coll.Sta.,Texas,U.S.A.) Evaluation of aerial herbicides as forest and range management tools in western coastal plain. Proc.13th annu.Meet.Sth.Weed Conf., 1960, 134-40, figs.1,bibl.4,tabs.1.

The authors discuss the cost and conditions suitable for prescribed burning of hardwood

understory for pine release, the plant associations on 3 soil types in E. Texas, the influence of soil type and moisture on herbicidal effect, and the economic practicability of herbicidal use in the various conditions considered. A list of the susceptibility of 24 spp. to 2,4,5-T is included. - D.M.L.S. [O.W.]

1447. RAY, H.C. (Soil Conserv.Serv., Fayetteville,Arkans.,U.S.A.) Significance of site in aerial chemical pine release in the forested coastal plain of Arkansas. Proc.13th annu.Meet.Sth.Weed Conf., 1960, 121-33, tabs.3,bibl.3.

Details are given of the characteristics (soils and topography, trees, site index, use and management limitations) of 6 sites in the Forested Coastal Plain Area of Arkansas and of the average hardwood kill and the forage production for each site after 4 annual aerial applications of 2,4,5-T (ester) 2 # in 1 gal diesel oil and 3.5 gal water. On sites having lower site index ratings (average height of tallest trees in 50 years) the control was much better with 1 application than on sites having high site index ratings. A correlation between soil-plant-water relationships and the hardwood control was also found. A list of the forage plants studied and some reactions to release is included. The increased production of native grasses varied with the sites; factors governing this variation (e.g. the tree stand, site index, % shade) are discussed. - D.M.L.S. [O.W.]

1448. MERRIFIELD, R.G. and HANSBROUGH, T. The use of urea herbicidal poisons in the eradication of undesirable hardwoods. Proc. 13th annu.Meet.Sth.Weed Conf., 1960, 212.

Fenuron pellets broadcast at 12 # gave 75% kill of hardwoods. Poor kill resulted from monuron, diuron and fenuron wettable powder formulations 4-12 # applied in 1 ft strips, 6 ft apart, monuron pellets broadcast at 12 # and fenuron wettable powder broadcast at 10 #. - M.E.L. [O.W.]

1449. CLARK, R.H. (Fordyce Lumber Co., Fordyce,Arkans.,U.S.A.) Practical application of herbicides as a tool in forest management. Proc.13th annu.Meet.Sth.Weed Conf., 1960, 205-11, tabs.1.

Excellent pine release was obtained by burning, followed by ground foliage spray of resulting regrowth within 1 year, and after the growing season frill applications or injections of 2,4,5-T to kill the remaining large hardwoods. Mist blowers have given promising results. - L.M. [O.W.]

1450. McCALEB, J.E., HODGES, E.M. and DANTZMAN, C.L. (Range Cattle Exp.Sta., Ona,Florida,U.S.A.) The response of saw palmetto to several herbicides. Proc.13th annu.Meet.Sth.Weed Conf., 1960, 113-17, tabs.3.

The effect on living buds and canopy cover of dalapon 20 #, 2,4,5-T 4 #, 2,4,5-TP 4 #, 2,4-D 6 # and erbon 120 # in 100% oil or water or in 50:50 mixtures is tabulated, also the effect of 2,4,5-T (butoxy ethanol ester) 2-4 # in water or in 9:1 water/oil mixture. Dalapon and erbon gave the best control but resulted in excessive damage to forage plants. The other compounds gave variable results, but 2,4,5-T and 2,4,5-TP appeared more effective than 2,4-D. - D.M.L.S. [O.W.]

1451. GRELEN, H.E. (Sth.For.Exp.Sta., U.S.Dep.Agric.) Seasonal foliage applications of 2,4,5-T on saw-palmetto. Proc.13th annu. Meet.Sth.Weed Conf., 1960, 109-12, figs.1, tabs.1,bibl.1.

Repeated mechanical clearing of Serenoa repens did not prevent resprouting and was costly. 2,4,5-T (propylene glycol butyl ether esters) 0.5-5 lb a.e./100 gal in 10% diesel oil and 90% water applied each month from January to September inclusive was most effective when applied in April and least when applied in June. (Flowering and fruiting occurred from May-June). January followed by March were the next best times of application. The best kill (78%) was given 1 year after treatment by 5 lb a.e./100 gal in April; 3.5 lb a.e./100 gal in April gave 72% and was probably the most economic. There was no significant difference between the 2 esters. Rainfall and temperature data failed to rationalize the monthly variations in response. - D.M.L.S. [O.W.]

1452. BEERS, W.L. and RODGERS, E.G. (Buckeye Cellulose Corp., Foley,Florida, U.S.A.) Herbicidal control of Swamp titi - a progress report. (Abstract) Proc.13th annu.Meet.Sth.Weed Conf., 1960, 185-6.

The propylene glycol butyl ether and the butoxy ethanol esters of 2,4-D and 2,4,5-T were chosen for further experimentation against Cyrilla racemiflora after screening trials. Analyses of root samples indicated that root reserves are lowest in late spring or early summer when leaves approach maximum

size and density. June was therefore chosen as the month to provide maximum downward translocation and distribution of herbicides throughout the root systems. - D.M.L.S. [O.W.]

1453. UNITED STATES. Undesirable woody plants. [6 Reports] Res.Progr.Rep.West. Weed Control Conf., 1960, 19-24.
Experiments on the selective control of Artemisia tridentata in Purshia tridentata showed:- susceptibility of Artemisia to 2,4-D or 2,4,5-T 3 # > Purshia; susceptibility of Purshia to 2,4,5-T > 2,4-D; both species were most susceptible to June spraying. The kill of Artemisia by aerial spraying with 2,4-D at 10 ft > 50 ft. Comparison of (a) areas with 100% control of Artemisia and (b) areas with no control showed that (a) held snow longer in the spring than (b) and the soil moisture at 18-19 in. depth in June, July and August in (a) was 63.8-30.2% > (b).
Good control by May 1959 of Quercus douglasii was given by 2,4-D PGBE (propylene glycol butyl ether ester) 2 # a.e. in May 1955 and 1957 and 2,4,5-TP PGBE 2 # a.e. in May 1955, June 1956 and May 1957 and of Rhus diversiloba by 2,4,5-TP PGBE 2 # a.e. in May 1955, 1956 and 1957 - the 2,4,5-TP treatments killed some Q. wislizenii. 2,4-D and 2,4,5-T PGBE 2 # a.e. were much less effective and damaged Pinus sabiniana. In general, effectiveness of follow-up spraying in May was greater than in June. Amine formulations were ineffective.
The % kill of Tamarix spp. in October 1959 following treatments in July 1958 at 20 # was fenuron 88%, monuron 47%, polychlorobenzoic acids 42%, 2,3,6-TBA 53% and 2,4-D (acid) <45%.
The rates of fenuron which effected Quercus turbinella were 8 # (old mature plants) and 16-64 # (sprouts in burned over areas). Results are given of chemical and mechanical assays on 15 soils and bioassays on 8 soils from chaparral areas. - M.E.L. [O.W.]

1454. UNITED STATES. (Amchem Products Inc.,Ambler,Pennsylvania,U.S.A.) Amitrol, benzac and combinations of both for control of woody plants. Tech.Serv.Data Sheet Amchem Products Inc., 1960, H-79, pp.5, bibl.11.
A list compiled from published and unpublished work on woody plant species susceptible (i.e. kill of 85% or more of the original stems with little or no regrowth after 2 growing seasons) to various rates of Amizol (90% active water soluble formulation of amitrol), Benzac 1281 (2 lb/gal triethylamine salt of 2,3,6-TBA) or a mixture of the two. Results from unpublished work were:- Rubus spectabilis, Acer macrophyllum and Western dewberry (Rubus spp.) susceptible to Amizol 4 lb/100 gal; R. spectabilis, Alnus rubra, A. macrophyllum, Salix spp., Tsuga heterophylla and Abies grandis susceptible to Benzac 1281 4 lb/100 gal. - M.E.L. [O.W.]

1456. PRINGLE, W.L. (Range Exp.Fm,Kamloops, British Columbia,Canada). The effect of a leaf feeding beetle on big sagebrush in British Columbia. J.Range Mgmt, 1960, 13, (3),139-42, figs.2,tabs.3,bibl.3.
The life history of Trirhabda pilosa is reviewed. The beetle, discovered on a 2 ac sagebrush area in 1954, had spread to an area of 2500-3000 ac in 1956. In 1958 it was found on areas up to 5 miles from the original site. The affected areas were at an altitude of 2000-3000 ft and had been invaded by Artemisia tridentata. On drier sites between 1100-2000 ft, which is the native range of A. tridentata, little or no damage is done by T. pilosa. A study over 4 years showed that T. pilosa is capable of destroying 50% of a sagebrush stand: this is done in the first or second year after invasion. Sagebrush plants near anthills were often virtually undamaged as the ants use the shrubs as aphid pasture. When collected and transported to 4 new areas only 1 colony showed any success after 3 years. - D.M.L.S. [O.W.]

1457. PIENAAR, A.J. (Dep.Pasture Techn, Univ.,Pretoria,S.Africa). Bush encroachment not controlled by veld-burning alone. Fmg S.Africa, 1959, 35,(9),16-17.
The 5 bush spp. found in most South African bushveld areas are Dichrostachys nyassana, D. glomerata, Acacia tortilis, A. tenuispina and A. nilotica. In those areas which have not been burned, certain bush spp., especially D. nyassana and D. glomerata, tend to die out when surrounded by good grass cover. Even when D. nyassana and D. glomerata are left undisturbed year after year where there is little grass they deteriorate in time. Burning will however stimulate them. Burning also makes the bush spp. form thickets which impede grazing, whereas if unburned they form a single stem which grows out above the grass and in 3 or 4 years are high enough for animals to graze beneath them. A. karroo can be controlled best if the veld is not burnt, especially in low-lying areas. - D.M.L.S. [C.A.]

1458. HOWELL, H.A. (Coll.Agric.,Univ. Arkans.,U.S.A.) Weeding the woodlands. Ext.Leafl.Arkans.agric.Coll., 1959, 283, pp.11, figs.
Gives general instructions for clearing pine, hardwood, and cedar forests of undesirable spp., under different conditions, with chemicals (no rates). - D.M.L.S.
[30(76.7)]

1459. COTNER, M.L. and JAMESON, D.A. Cost of juniper control: bulldozing vs. burning individual trees. Sta.Pap.Rocky Mtn For.Exp.Sta., 1959, 43,pp.14, figs.6,tabs.4.
Both bulldozing (using 100-125 draw bar h.p. machines with "hula-dozer" equipment) and burning (with a propane torch) resulted in 95-99% reduction in live tree crowns of Juniperus monosperma and J. osteosperma. Studies showed that costs were predictable if the following information is known: (a) the number of trees/ac by height classes, and time estimates for burning, bulldozing and moving from tree to tree in order to determine the average time/ac required and (b) expected equipment and labour costs to determine cost/ac. Costs from 1 burning and 15 bulldozer operations were within 10% of the costs computed by the method presented. The causes of variation are discussed. - D.M.L.S.
[O.F.]

1460. CRONIN, E.H. (State Univ.,Logan, Utah,U.S.A.) Effects of monuron on halogeton and associated salt-desert shrub vegetation. Weeds, 1960, 8,(2),168-72, tabs.2,bibl.14.
Monuron 0.5-8 # was applied under perennial shrubs along roadsides in an attempt to prevent the spread of Halogeton glomeratus by seed. The desirable perennials Artemisia tridentata, A. nova, A. spinescens, Atriplex confertifolia and Kochia americana were greatly reduced and the spread of Halogeton increased; invasion by Chrysothamnus viscidiflorus also occurred. The higher the rate of monuron the more damaging was its effect. - L.K.
[O.W.]

1461. BREWER, E.V. (Southeast For.Exp. Sta.,Macon,Georgia,U.S.A.) Progress report on control of honeysuckle and kudzu. Proc. 13th annu.Meet.Sth.Weed Conf., 1960, 187-93, bibl.6.
The ecology of Lonicera japonica and Pueraria thunbergiana is described and methods of control discussed. The following treatments applied twice during the growing season were successful:- Amitrol-T (amitrol + ammonium thiocyanate) 8 lb/100 gal + wetting agent; amitrol 4 lb/100 gal + wetting agent 4 oz; 2,4-D + 2,4,5-T 2:1 (butoxy ethanol esters) 2 lb a.e./65 gal. Monuron 60-80 # gave 100% control but was costly. Other herbicides tested were 2,4-D (acid and ester), 2,4-DP, 2,4,5-T, 2,4,5-TP, 4-CPA, MCPA, polychlorobenzoic acid, AMS and 2,4-D + 2,4,5-T (tetrahydrofurfuryl ester). Non-chemical methods of control tested were:- (a) winter grazing by cattle - temporary control; (b) fire - partial control; (c) ploughing - facilitated spraying but caused delayed sprouting from buried stolons; (d) sawdust mulching - a 3 in. layer was required. It was suggested that adequate control of both species would result from a combination of a chemical with a non-chemical pre- or follow-up treatment. - M.E.L.
[O.W.]

1462. UNITED STATES. The control of weeds and woody plants in rights-of-way and other ondustrial sites. [6 Reports] Abstr.Meet.Weed Soc.Amer., 1960, 17-20.
Top kill of brush by 2,4,5-T (ester) 6 # a.e. in oil 100 gal in October > polychlorinated benzoic acids (ester) + 2,4,5-T. The cane broadcast + ground method of application gave better control of suckering species e.g. black locust [Robinia pseudoacacia], sumac [Rhus vernix] and sassafras [Sassafras sp.] than the cane broadcast, basal or basal + ground methods. Penngift crownvetch [Coronilla varia] on highway slopes gave complete and permanent weed control and highly effective erosion control with zero maintenance.
No one chemical gave season-long control of vegetation of railway road beds but repeated low rates of some combinations were effective. Good brush control resulted from late winter and early spring applications of fenuron at rates depending on soil type. Results of vegetation control on uncropped ground by granular or liquid monuron and fenuron trichloroacetates are summarised. - M.E.L.
[O.W.]

1463. FRANCISCO, D.C. and MANN, R.A. (Tennessee Valley Authority,Chattanooga, Tennessee,U.S.A.) Right-of-way brush control revolutionized by the use of automatic spray nozzles. Proc.13th annu. Meet.Sth.Weed Conf., 1960, 95-9.
In the Tennessee Valley, use of Boomjet, or automatic spray, nozzles have reduced the cost of right-of-way brush control by an estimated 400%. The nozzles are brass, with 5 fixed-position tips and are made in

different capacities for rear mounting for a swath 38-66 ft wide. A full account is given of their use. - D.M.L.S. [O.W.]

1464. PRESCOTT, L.H. Small-plot studies on right-of-way brush control with combinations of TCA and certain substituted urea compounds. Proc.13th annu.Meet.Sth.Weed Conf., 1960, 91-4, tabs.4.

In brush control experiments fenuron-trichloroacetate (1) or fenuron gave more rapid kill than monuron-trichloroacetate (2) or monuron formulations. The % control after 12 months by the following treatments was: liquid concentrate (1) 21 ⅜ (30 ml injections in a grid pattern on 7 ft centres), 95%; pellets (22% active) 18 ⅜, 75%; fenuron pellets (25% active) 20 ⅜, 80%; pellets (2) (22% active) 20 ⅜, 76%; and monuron 80% wettable powder 20 ⅜, 60%. Surface run-off of granular formulations was not significant. The main species controlled were oak [Quercus sp.], hickory [Carya sp.], maple [Acer sp.], dogwood [Cornus spp.] and shortleaf pine [Pinus echinata]; Oxydendrum arboreum was not susceptible to the treatments. - M.E.L. [O.W.]

1465. UNITED STATES. The control of weeds and woody plants in forests. [5 Reports] Abstr.Meet.Weed Soc.Amer., 1960, 26-27.

Brief reports given on: aerial control of hardwood in pine using 2,4,5-T and 2,4,5-TP (esters); selective hardwood control by mechanical girdling supplemented by chemicals - 2,4,5-T (esters) in oil, 2,4-D (amine) or ammate; chemical control of Arceuthobium spp. and Phoradendron spp.; control of brush regrowth of fuel-breaks and the use of herbicides in industrial forest management. - M.E.L. [O.W.]

1466. BRINKMAN, K.A. (U.S.For.Ser.,111 Old Federal Building,Columbus 15,Ohio, U.S.A.) Killing oak brush a tricky business. Tech.Pap.Cent.States For.Exp.Sta., 1959, 165,pp.9, figs.1,tabs.4.

Monuron 0.5-2 lb/gal, ammate 1-4 lb/gal, 2,4,5-T 4 and 8 lb/gal and 4 lb/gal emulsion, and 2,4-D 4 and 8 lb/gal were applied in June, August and September as foliage sprays to dense 3-year old oak sprouts in 1952 (a dry year). Monuron gave consistently good kills of all spp. at all dates of application but was not considered economically practicable and sterilised many of the areas for 6-7 years. It is not included in the following analysis.

In general, June applications were best, though with black oak [Q. velutina] and scarlet oak [Q. coccinea] the highest control (89%) was given by September application of 2,4,5-T emulsion, followed by June applications of 2,4,5-T 8 a.h.g. (85%), 2,4-D 8 a.h.g. (75%), and ammate 2 lb/gal (75%). Blackjack oak [Q. marylandica] was best controlled by June applications of ammate 4 lb/gal (82%), ammate 2 lb/gal(67%). With post oak [Q. stellata] and white oak [Q. alba] June applications of 2,4,5-T 8 and 4 a.h.g. in water alone were more effective than the emulsion and gave the best control (92 and 88% respectively), ammate 4 and 2 lb/gal also applied in June being the next best treatments. 2,4-D was, in general, less effective than 2,4,5-T with all spp. - D.M.L.S. [O.F.]

1467. PEEVY, F.A. (Sth.For.Exp.Sta., Alexandria,La,U.S.A.) A comparision of different placements of 2,4,5-T ester applied as a basal spray for control of blackjack oak. Proc.13th annu.Meet.Sth.Weed Conf., 1960, 200-4, tabs.2,bibl.6.

2,4,5-T (propylene glycol butyl ether ester) in diesel oil was variously applied to Quercus marylandica in May 1958 and March 1959 and results assessed in September 1959. % Top kill and % trees with sprouts respectively were: (1) spraying the lower 2 in. of stem and wetting soil in a 4 in. band around the base of the trees, 92 and 5; (2) spraying the lower 12 in. of the stems only and protecting the soil, 92 and 7; (3) spraying lower 12 in. by conventional method, 100 and 13; (4) spraying 12 in. band of trunk starting 4 in. above the ground and protecting the lower parts, 68 and 62; (5) protecting stem and roots and spraying band 6 in. wide round the base of the trees, 25 and 4. - L.K. [O.W.]

1468. EAST AFRICA. (Dep.Agric.,Zanzibar). Biological control of Lantana. E.Afr.Fmr & Planter, 1959, 4,(3),25.

In Zanzibar, introductions of Teleonemia scrupulosa completely defoliated Lantana camara and spread slowly into areas adjacent to those into which it was introduced. Where L. camara was killed, the area was rapidly recolonized by Panicum trichocladum. Herb.Abstr., 30,663.

See also 1382, 1383, 1390, 1391, 1392, 1393, 1394, 1397, 1398, 1403, 1406, 1408, 1409, 1411, 1415, 1416, 1417, 1434, 1462, 1465, 1490, 1491, 1492, 1519, 1539.

1469. HOFFMANN, O.L., PULLEN, J.W., EPPERLY, J.R. and HOPKINS, T.R. (Res.Dep., Spencer Chem.Co., Kansas City, Missouri, U.S.A.) Factors affecting the activity of 4-chloro-2-butynyl N-(3-chlorophenyl) carbamate as a selective herbicide. Weeds, 1960, 8, (2), 198-208, figs.1, tabs.2, bibl.7.

Barbane 0.25 # gave effective control of heavily fertilized wild oats (Avena fatua) up to the 2.5 leaf stage, but when fertilization was low, 0.5 # was only effective up to the 1.25 leaf stage. This is explained by the increased growth of the wild oats due to the application of fertilizer. Experiments in which spray volumes of 5, 10, 20 and 40 gal/ac were applied showed the 40 gal/ac rate to be the most effective for control of oats and wild oats.

Species found to be susceptible to 0.025-0.5 # were: oats, wild oats, Polygonum convolvulus and P. pennsylvanicum. Portulaca grandiflora requires about 1 # to inhibit growth for 1 month.

The following plants are listed as being resistant to barbane: Setaria italica, S. viridis, S. glauca, Digitaria sanguinalis, Bromus inermis, Triticum aestivum, Secale cereale, Hordeum vulgare, Zea mays, Allium cepa, A. porrum, Beta vulgaris, Spinacea oleracea, Kochia scoparia, Chenopodium album, Mirabilis jalapa, Dianthus barbatus, D. plumarius, D. caryophyllus, Delphinium sp, Eschscholtzia californica, Iberis amara, Lobularia maritima, Raphanus sativus, Brassica napus, B. oleracea botrytis, B. oleracea, B. oleracea gemmifera, B. oleracea italica, B. napo-brassica, B. caulorapa, B. kaber, Cheiranthus cheiri, Capsella bursa-pastoris, Thlaspi arvense, Medicago sativa, Pisum sativum, Glycine max, Phaseolus vulgaris, Lathyrus odoratus, Dolichos lablab, Tropaeolum minus, Linum usitatissimum, Impatiens balsamina, I. sultani, Althaea rosea, Hibiscus esculentus, Gossypium hirsutum, Abutilon theophrasti, Viola tricolor, Godetia sp., Clarkia sp., Daucus carota, Pastinaca sativa, Ipomoea sp., Phlox sp., Slavia splendens, Verbena hybrida, Lycopersicon esculentum, Nicotiana sp., Schizanthus hybridus, Petunia hybrida, Antirrhinum majus, Digitalis purpurea, Scabiosa atropurpurea, Cucurbita pepo, C. maxima, C. moschata, Cucumis sativus, Lobelia sp., Dimorphotheca sp., Tagetes patula, Lactuca sativa, Helianthus sp., Aster sp., Cosmos bipinnatus, Calendula officinalis, Zinnia elegans, Centaurea cyanus, Ambrosia artemisiifolia, Ageratum houstonianum. - J.W.F. [O.W.]

1470. BACHTHALER, G. (Landesanst.Pflanzenbau, Bezirksstelle Deggendorf, Germany). Das Flughaferauftreten in Bayern in Spiegel der Getreide-Saatanerkennung von 1949 bis 1958. [The occurrence of wild oats in Bavaria as a reflection of cereal seed approval from 1949 to 1958.] Bayerisches Landwirtschaftliches Jahrbuch, 1959, 36, (5), 608-22, (G.du.), tabs.11.

In Bavaria wild oats [Avena fatua] was the cause of an average of 27.4% of cereal seed crops being condemned between 1949 and 1958. In regions where much wild oat occurs a sharp decrease in the area sown to spring cereals is desirable. - Landbouwdocumentatie, 16, M2761.

1471. GREAT BRITAIN. Beating the bogeys of fenland farming. Farm Weekly, 1960, 53, (2), 50, figs.1.

Reports that combine drilling which allows the use of 7 in. hoes in 7 in. rows has almost eradicated wild oats [Avena fatua] at a cost of little more than £2/ac. - L.K. [O.W.]

1472. JACQUES-FELIX, H. and ALEGRE, G. Action of maleic hydrazide on Cyperus rotundus. Agron.trop., 1958, 13, 789-90.

At dosages up to 6-fold the usual com. level, the tops were killed but not the rhizomes. At lower dosages a stimulation of growth was observed. - Chem.Abstr., 54, 7045d.

1473. GOWING, D.P. and LEEPER, R.W. (Pineapple Res.Inst., Hawaii). Uncommon plant growth regulators for the control of nutgrass and oxalis. Weeds, 1960, 8, (2), 279-83, tabs.2, bibl.3.

A number of phenoxyacetic, phenylacetic, benzoic and salicylic acids and various miscellaneous growth regulators which did not induce flowering in pineapples were tested on Cyperus rotundus and Oxalis martiana. Satisfactory results (at least 40% reduction in weed stand) on (a) Cyperus and (b) Oxalis were given by; phenoxyacetic acids - 2-methyl-5-bromo- (b), 2-bromo (b), 3-chloro-5-methyl- (a and b), 2-chloro-5-methyl- (a and b), 2-chloro- (b), 3-chloro- (b), 2,3-dichloro- (b), 2,5-dichloro- (a and b), 3,5-dimethyl- (b), 2-isopropyl-5-methyl- (b); phenylacetic acids - 2-chloro- (b), 3-chloro (b), 2,5-dimethyl- (a), 4-hydroxy- (b), 2-methyl- (a and b);

salicylic acids - 2-chloro- (b), 3,5-dibromo- (b), 3,5-dichloro- (b); 2,3,6-TBA (a); 4-chlorophenylmercapto-acetic acid (a and b); α-(2,4-dichloro-phenoxy)valeric acid (b); α-(3,5-dimethyl-phenoxy)propionic acid (b); β-(3,5-dimethyl-phenoxy)propionic acid (b); 4-phenanthrene-acetic acid (b) and phenylmercaptoacetic acid (b). - L.K. [O.W.]

1474. EGLITE, A.K. [Applying MH-T for the control of couchgrass.] Dok.Nauch. Konf.Zash.Rast., 1959, 409-15.
MH (triethanolamine) was tested for the control of couchgrass [Agropyron repens] at the AN Latvian SSR.Forestry Institute. Practical recommendations are given. - Ref.Zh.Biol., 1960, 44913.

1475. BRUCKNER, P.J. Untersuchungen uber die Ursachen der Verbreitung des Ackerfuchsschwanzes im Kreise Soest und Möglichkeiten zur seiner Bekämpfung. [Investigations on the causes of the spread of blackgrass in the Soest District and possibilities of controlling it.] Diss. Bonn, 1958, pp.69.
The cultural, but not the chemical control of blackgrass [Alopecurus myosuroides] is discussed and the results given of a survey of its occurrence in the environs of Soest (Westphalia). - From Landbouw-documentatie, 16,M2762. - L.K.

1476. HEARN, C.J. and BURTON, G.W. (A. & M.Coll.,Coll.Sta.,Texas,U.S.A.) Effects of two arsenical herbicides on several southern grasses. Proc.13th annu. Meet.Sth.Weed Conf., 1960, 224-7, tabs.1.
AMA (8% octyl ammonium methylarsonate and 8% dodecyl ammonium methylarsonate) and DMA [disodium methyl arsonate] were about equal in controlling Paspalum dilatatum and controlled it best when applied 3 times (at weekly intervals) at 75.2 ml and 66 g/1000 ft^2 respectively. However, these treatments were not significantly better than DMA 3 times at 33 g/1000 ft^2 or AMA twice at 75.2 ml/1000 ft^2. Best control of Digitaria sanguinalis was obtained with 3 applications of either AMA 75.2 ml (100%) or DMA 66 g/1000 ft^2 (95%). Control of Paspalum notatum (common and Pensacola) with both treatments was about the same as that of P. dilatatum. Sporobolis poiretti was unaffected by either. Three weeks after the last treatment no injury to Bermuda grass was observed. - Authors' Summary (modified). - D.M.L.S. [O.W.]

1477. * BROWN, E.R. The use of sodium TCA and dalapon to control the competition of perennial grasses with bitterbrush seedlings. For.Thesis,Univ.Idaho,1958.

1478. GREAT BRITAIN. The control of rushes. Advis.Leafl.Min.Agric.Fish.Fd, 1960, (revised), 433,pp.5.
A revised version which includes rotovation as a recommended control measure in some circumstances instead of ploughing. - D.M.L.S. [O.W.]

1479. AUSTRALIA. Colocynth - dangerous weed near Mannum. J.Dep.Agric.S.Aust., 1960, 63,(9),375.
[Colocynthis vulgaris] has been declared a "Dangerous" weed which necessitates its eradication. A well grown plant will smother an area 20ft across and bear 150 or more poisonous melon-like fruits. Seedlings may be destroyed with 2,4-D but established plants must be grubbed out and burnt. - L.K. [O.W.]

1480. ALBERT, W.B. (Clemson Coll.,S.Carolina, U.S.A.) Control of horsenettle (Solanum carolinense) in pasture. (Abstract). Proc. 13th annu.Meet.Sth.Weed Conf., 1960, 49.
Infestations in Bermuda grass pasture were greatly reduced but not eliminated by 3 applications in 4 years of amitrol 3 # or 2,4-D 2-4 #; chlorobenzoic acids were less effective. Amitrol 1.5 # + chlorobenzoic acids 1 # or + 2,4-D 1 # were highly effective. Bermuda grass was not permanently injured by amitrol 3 #. - L.K. [O.W.]

1481. UNITED STATES. Herbaceous range weeds. [6 Reports] Res.Progr.Rep.West. Weed Control Conf., 1960, 11-17, figs.2, tabs.3.
Graphs show the depth of root penetration and shoot length of medusa head [Elymus caput-medusae], cheatgrass [Bromus secalinus], crested wheatgrass [Agropyron cristatum] and intermediate wheatgrass; active root growth starts in mid-March and shoot growth in mid-April. 2,4-D (propylene glycol butyl ether ester) 1.5 # applied when Zygadenus paniculatus was in the 3-leaf stage gave over 90% kill; application at the full flower stage or later was much less effective; 2,4,5-T (PGBE) was less effective than 2,4-D. Artemisia tridentata was susceptible when Zygadenus was in the 5-leaf stage. July treatment of Delphinium barbeyii with amitrol 0.5-1.5 #, 2,4-D 1.5-4.5 # or PBA [polychlorobenzoic acid] 2-6 # was ineffective. Land previously almost cleared of Hypericum

perforatum by Chrysolina beetles is now being recolonised by the weed although the beetles are still present. Treating Rudbeckia occidentalis in August with amitrol 3 # gave complete control, with 2,4-D 3 # 78%, and with PBA 40%. Linaria dalmatica was controlled 90% by July 1st applications of 2,3,6-TBA (sodium) 2 #, 70% by 2,3,6-TBA 2 #, 60% by 2,4-D (PGBE) and 50% by 2,4-D (isooctyl); later applications were less effective except for the latter. - L.K.
[O.W.]

1482. IDROBO, M.E.A. Represion de malezas en zanjas y canales de riego mediante herbicidas. [Control of weeds in ditches and canals with herbicides.] Acta Agron. (Palmira), 1958, 8, (4), 181-96, (Span.e.)
Effectiveness of control was found to vary with seasonal conditions. In the dry season satisfactory control was obtained for at least an 8-week-period with a mixture of 35 kg of 2,4,5-T and 50 kg of TCA/ha and likewise with a mixture of 45 kg monuron and 30 kg of 2,4,5-T/ha. In the wet season 4 treatments as follows gave satisfactory control for at least an 8-week-period: (1) 50-70 kg of monuron/ha; (2) a mixture of 45 kg monuron and 30 kg 2,4,5-T/ha; (3) a mixture of 40 kg monuron and 40 kg TCA/ha; (4) a mixture of 15 kg 2,4,5-T and 50 kg TCA/ha. The weed population consisted mainly of Panicum purpurascens, Cynodon dactylon, Portulaca oleracea, Solanum nigrum americanum, Amaranthus dubius, Bidens pilosa, Tagetes sp., Senecio sp. and Cyperus rotundus. - Biol.Abstr.,Plant Sciences, 35, 27861.

1483. UNITED STATES. Annual weeds in cereals and forage crops. [8 Reports] Res. Progr.Rep.West.Weed Control Conf., 1960, 25-30, tabs.3.
In greenhouse tests, wheat and barley were not reduced by barbane 0.5 #; slight injury was caused by 1 # when cereals were in 2-leaf stage, and this injury increased with age of the cereals. Oats, Avena fatua, Echinochloa crusgalli, Setaria viridis, and Bromus tectorum, treated in the 2-leaf stage with barbane 0.5 # were reduced by 95.8 %, 90.1%, 92.5%, 75.7% and 64.8% respectively. In field tests barley was resistant to 2 # post-em. and wheat was moderately susceptible.
Sugar-beet was found to be resistant to Avadex [2,3-dichloroallyl diisopropylthiolcarbamate] 3 # incorporated into the soil. Wheat, barley and oats were reduced 70% by 1 #, and Echinochloa crusgalli and Setaria viridis were moderately susceptible. When Avadex was not incorporated into the soil, no growth reduction was observed in wheat, oats, barley or Avena fatua; 1 # pre-planting and disced into the soil gave 50% control of A. fatua and 2 # almost complete kill.
In a greenhouse experiment 2,6-dichlorobenzonitrile 0.5 # incorporated into the soil resulted in complete elimination of wheat, oats, barley, Echinochloa crusgalli, and Setaria viridis; when it was not incorporated, barley was resistant, but 1 # reduced wheat, oats and A. fatua by 60%.
After cutting and removing 1-year-old lucerne, diuron 1.5 and 2.5 # applied to the soil and stubble in November, December and March caused significant reductions in hay yields except the 1.5 # rate applied in March; all applications gave excellent control of Sonchus asper and Sisymbrium irio.
Lay-by treatments of dalapon 15 and 25 #, amitrol 8 and 16 #, and 2,3,6-TBA 3 # were made in May to maize 20-24 in. high; dalapon caused severe, and amitrol 16 # slight stunting; 2,3,6-TBA had no apparent effect.
Agrostemma githago was treated at early bud stage with the amines of 2,4-D, 2,4,5-T, MCPA and 2,3,6-TBA each at 1 #, and dinoseb (amine) 3 #, all in 40 gal water/ac. Thirty days later, all plants had completely recovered except those sprayed with MCPA, which gave 100% control.
Endothal (1) 4 and 8 #, monuron (2) 1 and 2 #, 2,3,6-TBA (3) 4 and 8 #, propham (4) 4 and 8 # and granular 6 #, and chlorpropham (5) 4 and 8 # and granular 6 # were applied to Merion bluegrass when Bromus tectorum was in the seedling stage; (1) 4 #, (4) 4 # and granular 6 #, (5) 8 # and granular 6 # gave >75% control. Of these, (1) and (4) did not cause a significant reduction in seed yield of the bluegrass. (4) 4 and 8 # and (1) 4 and 8 # applied in the spring gave 45 and 60% and 0 and 10% control respectively. The 4 # rate of each did not cause a significant reduction in seed yield of bluegrass.
Atrazine 2 # + amitrol 1 # gave 100% control of volunteer wheat (1), Bromus tectorum (2) and Amsinckia intermedia (3), Polygonum aviculare (4) and Salsola kali var. tenuifolia (5). Atrazine 1 # gave 70% control of (5), 80% of (1), 90% of (2) and (3), and complete control of (4). Atrazine 1 # + amitrol 1 # gave 40% control of (5), and 100% of all other species. Atrazine 0.5 # + amitrol 1 # gave 100% control of (1) and (2), but

poor control of (3), (4) and (5).
In each case, (1), (2) and (3) were treated after they had emerged and (4) and (5) before emergence in the spring. - J.W.F.
[O.W.]

1484. UNITED STATES. Weeds in agronomic crops. [10 Reports] Res.Progr.Rep.West. Weed Control Conf., 1960, 39-54, tabs.11.
Maize. [3 Reports] Pre-em. simazine 1-4 # and atrazine 2 and 4 #, and post-em. atrazine 1 and 2 # gave excellent control of Kochia scoparia, Chenopodium album, Amaranthus retroflexus, and Helianthus annuus, and post-em. atrazine 1 and 2 # and pre-em. EPTC 2 and 4 # gave very good control of Setaria viridis and Echinochloa crusgalli, without damaging the crop. Simazine pre-planting 1-4 # gave good control of Echinochloa colonum, E. crusgalli, Sisymbrium irio, Malva parviflora, Chenopodium murale, Portulaca oleracea and Sonchus asper; pre-planting gave better control than pre-em., and pre-em. better than post-em.
Cotton. [2 Reports] Pre-em. herbicides were incorporated into the soil to a depth of 1.5 in. for annual grass control:- (1) CDAA, CDEA, CDEC, NPA and chlorpropham 12 # in. and Zytron 16 # in. gave adequate weed control with negligible injury to the cotton; (2) 2,6-dichlorobenzonitrile, EPTC, propyl dipropylthiolcarbamate, ethyl ethylbutylthiolcarbamate, and propyl ethylbutylthiolcarbamate 8 # in. gave good weed control but caused moderate to severe injury to cotton; (3) diuron, monuron, simazine, trietazine, ipazine, methoxy simazine, methoxy propazine and methoxy ipazine 4 # in. and dinoseb 12 # in. had little effect on crop or weeds. A comparison of the use of monuron and diuron 1-4 # applied when cotton had 4 true leaves and when it was 15 in. tall showed monuron to cause severe stunting while diuron only caused slight chlorosis and was more effective in controlling early annual grasses. Injury was more severe on soils containing a high % of sand.
Grasses (grown for seed). [1 Report] Yields of orchard grass, timothy, and bent grass were not significantly reduced by early May treatment with 2,4,5-TP (ester), 2,4,5-T (ester), MCPA (amine), 2,4-DB (amine), and 2,4-D (amine and acid) 2 #; however, yield of creeping red fescue was significantly reduced by 2,4,5-TP and 2,4,5-T esters 2 #.
Peas. [1 Report] Barbane and atrazine 1 and 2 # were applied when peas were 1 in. high and wild oats [Avena fatua] at 1-2 leaf stage, and again 2 weeks later. First application did not damage peas and barbane gave excellent wild oat control, atrazine had no effect; second application of barbane caused severe stunting of both but did not kill either, while atrazine had no effect.
Sugar beet. [3 Reports] Pre-em. endothal, EPTC and CDEC up to 1 #, liquid and granular formulations were compared and the latter were found to cause less injury. Soil-incorporated EPTC and related compounds ethyl ethylbutylthiolcarbamate, and propyl ethylbutylthiolcarbamate gave better control of grasses than broad-leaved weeds, the latter showing a wider margin of selectivity and longer lasting herbicidal activity than the others. TCA showed promise where grasses were the only weeds present. - J.W.F.
[O.W.]

1485. UNITED STATES. Perennial herbaceous weeds. [14 Reports] Res.Progr.Rep.West. Weed Control Conf., 1960, 1-10, tabs.10.
Cirsium arvense. Outstanding results were given by 2,3,6-TBA, PBA [polychlorobenzoic acid], 1:4 amitrol + PBA and amitrol alone. Amitrol 8 # high volume gave 100% control at the rosette or early bloom stages - 2,4-D 40 # was less effective.
Leafy spurge [Euphorbia esula]. > 90% control was given by 2,4-D 32 #, 2,4,5-T 64 #, 2,4,5-TP 64 # and sodium chlorate 630 #; less effective were lower rates of the above and MCPA 64 #, TBA 64 #, amitrol 64 #, monuron 80 #, diuron 80 #, borax ca. 1300 #, sodium chlorate + borates, 2,4-D + borates.
Agropyron repens. When applied to a maize seedbed atrazine 8 # allowed of no regrowth the following year, whereas simazine allowed of 50% regrowth. Amitrol + ammonium thiocyanate was better than amitrol alone.
Convolvulus arvensis. 2,4-D was better than 2,4,5-T which was better than 2,4,5-TP.
Physalis subglabrata. Amitrol 2 # was better than 2,4,5-T 2 #; best results were obtained when soil moisture was high. TBA was promising and 2,4,5-TP of doubtful value.
Johnsongrass [Sorghum halepense]. Dalapon (ester) 30 # was slightly better than dalapon (sodium) 30 # + amitrol 4.5 # and both were somewhat better than dalapon (sodium) 30 # alone.
Solanum elaeagnifolium. Amitrol 4 # gave 90% control and was better than 2,3,6-TBA 20 #, PBA 40 # or 2,4-D (ester or amine) 2 #.
Centaurea picris. 2,3,6-TBA 20 # and PBA 40 # gave 94% control and amitrol 8 # 20%.
Franseria tomentosa. 2,3,6-TBA 10 # and PBA 20 # gave 94% control and twice these rates 99.8-100%; amitrol 8 # gave 72% control. TBA, PBA, 2,4-D (amine) and DB Granular [2,4-D + borates] were applied to irrigated

land in September and the following sown (or observed) the following spring: (1) bindweed [Convolvulus arvensis], (2) maize, (3) sorghum, (4) oats, (5) barlay, (6) lucerne, (7) Pinto beans, (8) Castor beans, (9) potatoes, (10) sugar beet, (11) onions, (12) tomatoes, (13) cucumber, (14) watermelons and (15) cantaloupes. TBA at 5 # had little effect only on 2 and 4; at 20 # all were severely affected. PBA 10 # and 40 # had similar effects to TBA 5 and 10 # respectively. 2,4-D (amine) 80 # only seriously affected 12-15 and DB Granular 80 # 7, 8, 9, 12-15. - L.K. [O.W.]

1486. UNITED STATES. The control of weeds and woody plants in pastures and rangelands. [8 Reports] Abstr.Meet.Weed Soc.Amer., 1960, 21-5.

Better control of wild garlic [Allium vineale] resulted from single or repeated applications of 2,3,6-TBA (dimethylamine salt) than from 2,4-D (propylene glycol butyl ether ester). Mature dormant bulbs were unaffected 45 days after treatment of plants on April 1st; all other bulbs showed necrosis and apparent food reserve exhaustion together with growth modifications in developing dormant bulbs. The % kill of multiflora rose [Rosa multiflora] was 92% by 2,4,5-T 2.5-10 lb a.e./100 gal as 3 annual foliage sprays or 90% by monuron (dust or water suspension) 10.4 g/plant, 87% by 2,3,6-TBA 20.8 g/plant, and 87% by SMDC 32 g/plant as soil treatments; 2,4-D, 2,3,6-TBA or amitrol as sprays and simazine as a soil treatment were less effective. Increased yield of Bermuda grass resulted from control of weedy aster [Aster paniculatus] by diuron, fenuron or simazine 2.5-5 # in spring and Rumex and Croton spp. by 2,4-D and 2,4-DB.

Good control of Karwinskia humboltiana was given by basal stem spraying with 4-6% solutions in oil of esters 2,4,5-TP, 2,4,5-T or brush killer + dalapon or hexachloropentadiene or by soil treatments with fenuron (pellets); foliage sprays were unsatisfactory. - M.E.L. [O.W.]

1487. TANGANYIKA. Sodom apple control. Rep.Tanganyika agric.Corp. 1957-8, 64-9.

The effect on regeneration of bush, especially Sodom apple (Solanum delagoense), of grazing at different times of the year, mowing after grazing and burning every second or third year at the end of the dry season was studied. Under all treatments, the population of S. delagoense increased from 5000-9000 plants/ac in 1955 to 19 000-35 000/ac in 1958. Differences between treatments were not significant. Fresh weights of grass, samples in February, 1957, ranged from 27 cwt/ac, on plots grazed in the growing season and mown after grazing, to 76 cwt/ac, on plots grazed in the dry season and burnt every third year. Two applications of 2,4-D (amine) or 2,4,5-T (ester) at various rates [not stated] gave good control of S. delagoense. In a further experiment laid down in December, 1956, S. delagoense was sprayed at different growth stages with a 2,4-D (amine) formulation at 3 pints/100 gal water/ac. Determination of plant populations in May, 1957, showed that the greatest reduction occurred on plots sprayed when the first berries appeared. After a second spraying in May, 1957, the populations of all the treated plots, recorded in January, 1958, were less than 1% of those of the control plots. - Herb. Abstr., 30,664.

Noted

1488N. DERSCHEID, L.A., WALLACE, K.E. and NASH, R.L. (Agric.Exp.Sta.,State Coll., S.Dakota,U.S.A.) Russian knapweed control with cultivation, cropping and chemicals. Weeds, 1960, 8,(2),268-78, tabs.3,bibl.10.

A somewhat fuller version of Weed Abstr., 7,2274. - L.K. [O.W.]

1489N. COX, J.R. (Chesterford Park Res. Sta.,Fisons Pest Control Ltd.,Saffron Walden,Essex,England). Complete weed control with chemicals. Wood (London), 1960, 25,(1),30-1.

A general discussion of total weedkillers.- J.W.F. [O.F.]

CHEMISTRY, PHYSICS, TOXICOLOGY, RESIDUES AND SOILS

See also 1391,1433,1515,1539.

1490. UNITED STATES. Technical information 1960. NIA 5996 an experimental herbicide. Tech.Inf.Sheet Niagara Chem.Div., 1960, pp.10.

2,6-dichlorobenzonitrile (discovered by N.V. Philips-Duphar) is a light cream-coloured powder, melting point 141-144°C,

solubility in water at 25°C is 10 p.p.m., in xylene 5%, in isophorone 10%, in dimethylformamide 16.7%, in dimethyl sulphoxide 7%, in acetone 14% and in methylene chloride 7%. It is supplied as a 50% wettable powder (which requires continuous agitation) and as a 4% granular formulation. The acute oral LD 50 to mice is 2710 mg/kg and the acute intraperitoneal 1260 mg/kg. In a 3-week feeding test 300 p.p.m. in the diet had no effect, 1000 and 3000 p.p.m. caused growth depression and 10 000 p.p.m. mortality. The compound is active against weeds before they emerge and is best incorporated into the top 0.5-1.5 in. layer of soil. The following crops are tolerant of pre-em. applications: barley, castor bean, maize, cotton, gladiolus, lima beans, peas, peanuts, potatoes, rice, snapbeans, sorghum, soybeans, sunflower, walnut, wheat. Sensitive crops are: lucerne, birdsfoot trefoil, buckwheat, carrots, flax, lespedeza, lettuce, oats, red clover, ryegrass, spinach, squash, sugar beet, red beet, tomatoes, white clover. Crops reasonably tolerant to post-em. applications are cabbage, castor beans, cotton, cucumbers, maize, flax, gladiolus, lima beans, peanuts, peas, rice, snapbeans, sorghum, soybeans, sweet corn, red beets, tobacco, tomatoes and walnut. Crops sensitive to post-em. applications are: buckwheat, carrot, lettuce, oats, spinach and squash. Weeds susceptible to the usual rates (ca. 1-4 #) are listed. - L.K. [O.W.]

1491. UNITED STATES. Technical information 1960. Karsil an experimental herbicide. Tech.Inf.Sheet Niagara Chem.Div., 1960, pp.12.

N-(3,4-dichlorophenyl)-2-methylpentanamide is a white to light tan powder with a melting point of 101-109°C. It is insoluble in water, 4% soluble in xylene, 33% in methanol and ethanol, 25% in isophorone, 71% in dimethylformamide, 71% in dimethyl sulphoxide, 31% in diisobutylketone, 40% in methyl isobutylketone and 27% in pine oil. It is supplied as a 24.9% emulsifiable concentrate which requires agitation before and during application. The acute oral LD 50 to rats is >10 000 mg/kg, the acute intraperitoneal LD 50 >3160 mg/kg, the acute dermal LD 50 to rabbits >10 000 mg/kg. In a 28-day feeding test 0.1-1% in the diet suppressed growth but did not produce gross signs of toxicity. 3 mg applied to the eyes of a rabbit produced no systemic toxicity. No skin sensitization was caused in guinea pigs. The acute oral LD 50 of Karsil 2 E.C. is 2710 mg/kg of the 24.87% formulation. The compound is primarily active on annual grasses up to 1.5 in. tall and annual broadleaved weeds up to 2 in. tall. Susceptible plants stop growing and become necrotic and die. Crops tolerant of overall applications are: carrots, celery, parsley, parsnips, strawberries, euonymus, glacier ivy, Scots pine, Vinca and white spruce; crops tolerant of directed sprays are: asparagus, maize, sweet corn, cotton, onions, southern peas, sorghum, soybeans, sugar cane, arbor vitae, azaleas, boxwood, carnations, chrysanthemums, dahlias, roses and Taxus cuspidata. Crops susceptible to overall applications are: lucerne, asparagus, cabbage, cauliflower, maize, cotton, cucumbers, eggplant, endive, flax, Hegari sorghum, kale, kenaf, lettuce, lima beans, muskmelons, oats, onions, peas, peanuts, pepper, potato, pumpkin, radish, rice, ryegrass, snapbeans, sorghum, soybean, spinach, winter squash, sugar beet, sweet potatoes, red beet, tobacco, tomato, wheat, asters, chrysanthemum, larch, pansy, Taxus cuspidata and tulip. Weeds susceptible and resistant to the normal rate of application (ca. 4 #) are also listed. - L.K. [O.W.]

1492. UNITED STATES. Technical information 1960. Solan anexperimental herbicide. Tech. Inf.Sheet Niagara Chem.Div., 1960, pp.9.

N-(3-chloro-4-methylphenyl)-2-methylpentanamide is a white to pale cream powder with a melting point of 82-86°C. It is insoluble in water but 20-30% soluble in xylene, 46% in diisobutyl ketone, 55% in isophorone, and 52% in methyl isobutyl ketone and 41% in pine oil. It is supplied as a 46.9% emulsifiable concentrate. As a post-em. spray it has shown promise in carrots, celery, parsley, safflower, sorghum, strawberry, tomatoes, and seedbeds of Scots pine and white spruce. It has shown some promise in maize, oats, peas, potatoes and sweet corn, while the following are susceptible: broccoli, cabbage, cauliflower, collards, cotton, cress, cucumbers, eggplant, endive, Hanover salad, kale, lettuce, lima beans, lucerne, onions, peanuts, peppers, ryegrass, snap beans, spinach, sugar beet, table beet, tobacco, turnips, gladioli and seedbeds of larch. A list of 28 susceptible and 6 resistant weeds is given. Some activity has been shown against weeds pre-em. e.g. on Chenopodium album, but it is most effective after emergence on broadleaved weeds <2 in. and grasses <1 in. Tomatoes will tolerate ca. 4 # (although some varieties, e.g. Bonnie Best may be more susceptible) this is ca. twice the rate necessary for weed control. The acute oral LD 50 to rats is >10 g/kg and the acute intraperitoneal LD 50 >3160 mg/kg. 10 g/kg produced only mild transitory

dermal irritation to rabbits and caused no skin sensitization in guinea pigs. Incorporating 1% in the diet for 28 days had no effect on rats. The acute LD 50 of Solan 4 E.C. is 5750 mg/kg. - L.K. [O.W.]

1493. BASKAKOV, Yu.A. and MELNIKOV, N.N. The isopropyl ester of 3-chlorophenylcarbamic acid as a herbicide. Org.Insektofungitsidy i Gerbitsidy, 1958, 279-90.
Synthesis, method of analysis and properties of chlorpropham. - From Chem.Abstr., 54,10218b. - M.E.L.

1494. BOUWMAN, W.C.E. Determination of (4-chloro-2-methylphenoxy)acetic acid (MCPA) and 2-methyl-4,6-dinitrophenol (DNC) or 2-sec-butyl-4,6-dinitrophenol (DNBP) in mixtures of both compounds by chromatographic separation. Chem.Weekblad., 1959, 55, 540-1.
These mixtures, used as herbicides, are separated on a cellulose column with a 1:1 mixture of ether and $CHCl_3$ as eluent; both column and eluent are treated with phosphate buffer of pH 6.8. The fractions containing DNOC or dinoseb are extracted with NaOH solution, and extinction of the extract is determined at 370 or 375 mμ. The MCPA-containing fractions are distilled, and the residue is dissolved in EtOH and analysed spectrophotometrically by Grabe's method. - Chem.Abstr., 54,7047h.

1495. COOMBS, G. (Johns-Manville Corp., Manville,New Jersey,U.S.A.) Pesticide formulation .....as seen by a producer of carriers. Agric.Chemic., 1960, 15,(6), 47,49-50,103,105, figs.2.
A general article. - L.K. [O.W.]

1496. GOROG, L. (Mehezvegyipari Kutato Intezet,Veszprem,Hungary). Preparation of chlorinated phenoxyacetic acid derivatives biologically inactive hexachlorocyclohexane isomers. Mehezvegyipari Kutato Intezet Koslemenyei, 1959, 1,309-11.
From Chem.Abstr., 54,7613 d. - M.E.L.

1497. KREWSON, C.F., CARMICHAEL, J.F., DRAKE, T.F., MITCHELL, J.W. and SMALE, B.C. (ARS,U.S.Dep.Agric.,Philadelphia 18, Pennsylvania,U.S.A.) Synthesis and preliminary evaluation of amino acid derivatives of 2-(2,4,5-trichlorophenoxy)propionic acid. J.agric.Fd Chem., 1960, 8,(2), 104-6, tabs.2,bibl.8.
Synthesis, analysis, melting points and optical rotations of 33 D-, L- and DL- amino acid derivatives of 2,4,5-TP are described. Evaluation as plant growth regulators on Pinto bean, large seeded sunflower, and Arlington White Spine cucumber showed that the DL-aspartic acid derivative and the DL- and L- forms of alanine, cystine, leucine, methionine, phenylalanine and threonine derivatives were active but less so than the parent acid. The D-amino acid derivatives, except D-alanine and D-tryptophane showed no appreciable activity. Physical and chemical constants only are also given for L-hydroxyproline, DL-serine, valine, N N'-bis[DL-2-(2,4,5-trichlorophenoxy)propionyl]-cystine and lysine. - M.E.L. [O.W.]

1498. GOLDSTEIN, H.E. and LONG, J.F. (Ohio Dep.Agric.,Diagnostic Lab.,Reynoldsburg,Ohio,U.S.A.) Observations on cattle, sheep and swine exposed to 2,4-D, 2,4,5-T and dalapon herbicides. Proc.13th annu. Mect.Sth.Weed Conf., 1960, 5-11, bibl.6.
Spraying the skin of a calf with 1 pint of standard (1.5 lb/100 gal) 2,4-D, of a cow with 0.5 gal standard 2,4-D + 2,4,5-T (1.5 lb/100 gal), or of sheep and pigs with 1 quart of the mixture caused no ill effects. Adding 0.25 pint of the mixture to every 5 gal of drinking water of 2 cattle for 41 days caused no harm. Pasture sprayed early or late in the season was not preferentially grazed by cattle, even by a calf deprived of salt for 6 weeks. Two calves grazed on pasture sprayed with dalapon 30 lb/100 gal were unaffected. Spraying the skin of calves with 1 gal standard strength dalapon (20 lb/100 gal) or of sheep or of a pig with 1 quart had no effect. Adding 1 pint of standard strength dalapon to each 5 gal of drinking water of 3 cattle, 3 sheep and 1 pig for 2 weeks was not injurious. No ill effects were caused to calves or sheep by grazing Sudan grass or oats sprayed with dalapon. - L.K. [O.W.]

1499. WHITESIDE, J.S. and ALEXANDER, M. (Cornell Univ.,Ithaca,N.Y.,U.S.A.) Measurement of microbiological effects of herbicides. Weeds, 1960, 8,(2),204-13, figs.4,tabs.2,bibl.11.
2,4-D, 2,4,5-T, 2,4-dichlorophenoxypropionic acid, 2,4-DB and amitrol were incubated in a Warburg respirometer with a mineral salt medium and soil. At 100 p.p.m. none of the compounds had any effect on oxygen evolution; at 250 p.p.m. only 2,4-DP was without any effect. Spectrophotometric determinations

of the centrifuged liquor after incubating soils with 2,4-D, 2,4-DP, 2,4-DB, 2,4,5-T, 2,4,5-TB and 2,4,5-TP for varying periods over 25 days showed that only 2,4-D and 2,4-DB appeared to be broken down; the trichloro- derivatives were unaffected even after 3 months. Varying the pH from 4.5 to 7.8 appeared to have little effect on the breakdown of 2,4-DB. That the addition of a "2,4-D enrichment" to 2,4-DB was found to accelerate the decomposition of 2,4-DB whereas the reverse did not occur, is taken as indicating that 2,4-DB is probably broken down to 2,4-D in the soil. - L.K. [O.W.]

1500. BURNSIDE, O.C. (Univ.,Minnesota, U.S.A.) The influence of environmental factors on the phytotoxicity and dissipation of simazin. Ph.D.Thesis,Univ.Minnesota, 1959, pp.114, Microfilm $2.50, Xerox $5.60.
Clintland oats, Flambeau soybeans, and single cross A502 x A556 maize were the 3 bioassay crops used to determine quantitatively the amount of simazine in Waukegan silt loam. The oats, soybeans, and maize were sensitive in the ranges of 0.25-1, 0.5-8, and 8-256 p.p.m. simazine, respectively. Simazine 2 and 4 # significantly increased maize and decreased weed dry weight yields of above ground parts grown in this soil. The response of 8 field crops to simazine listed from most tolerant to most susceptible is as follows: single cross maize, Norghum sorghum, Marine flax, Flambeau soybeans, Caribou rye, Selkirk wheat, Kindred barley and Clintland oats. These simazine applications did not adversely affect the nitrification process or the overall microbial activity of the soil. Organic matter, and to a lesser extent, clay content of the soil, reduced simazine phytotoxicity. Adjusting the pH from 5.4 to 7.2 and 8.5 increased the toxicity of 8 p.p.m.w. of simazine to maize; also increased soil temperature, within limits, increased simazine toxicity to maize. Conditions conducive to increased transpiration resulted in reduced toxicity to maize. - From Diss.Abstr., 20,3914. - J.W.F.

1501. BRUINSMA, J. (Plant Phys.Res.Cent., Wageningen,Netherlands). The action of 4,6-dinitro-o-cresol (DNOC) in soil. 1. The emergence from cress seed in DNOC-treated soil mixtures. Publ.Plant Phys.Res.Cent., Wageningen, 1960, 8,pp.10; Plant & Soil, 1960, 12,(3),249-58, figs.2,tabs.1,bibl.17.
DNOC when added to unsterilized soil in initially toxic amounts increased the emergence % of cress seeds when these were sown some time after the DNOC treatment. Data is adduced which indicated that this increase could not be ascribed to a stimulation exerted by DNOC or by some breakdown product of DNOC. Since the ultimate emergence % of cress seedlings is greater in sterilized soil than in unsterilized, it is suggested that the enhanced emergence after addition of DNOC to unsterilized soil is due to a partial sterilization of the soil by DNOC, the advantages of which outlast the breakdown of DNOC by the remainder of the microflora. This theory is discussed in relation to the yield-increasing effect of DNOC on crops. - From Author's Summary (modified). - D.M.L.S. [195(492)]

APPLICATION AND MACHINERY

See also 1394, 1410, 1436, 1463.

1502. CRAIG, J.W. (Forestry Suppliers Inc., Jackson,Miss.,U.S.A.) A new mist blower. Proc.13th annu.Meet.Sth.Weed Conf., 1960, 166.
Briefly states that a new mist blower, the "Hurricane", weighing 300 lb, with a 32 gal tank and powered by a 9 h.p. Briggs or Stratton engine, with a blast wheel discharging up to 2000 ft^3/minute at 180 m.p.h. and suitable for mounting on any vehicle has given very promising results. - L.K. [O.W.]

1503. HARRINGTON, T.A. and KRING, J.S. Time for the tree injector. Sth.Lumberman, 1960, 200,(2491),40,42.
The injector consists of a sharp bit, 2 to 3 in. wide attached to the lower end of a cylinder or reservoir which holds the arboricide solution. The injector is held at about a 30° angle and the bit jabbed into the tree base close to the ground. Jabs should be spaced 2 to 3 in. apart around the tree base. 2,4,5-T 4 lb a.e. in 9 gal diesel oil is commonly used in this injector. An estimate of man hours and arboricide requirements for treating a number of trees is given. - J.W.F. [O.F.]

1504. UNITED STATES. New research tool will help scientists. Agric.Res., 1960, 8,(12),6, figs.2.
Photographs and very brief description of a

box for the even application of dusts which is suspended (for raising and lowering) in a frame mounted on castor wheels.
In the centre of the transparent plastic top is a perforated dispenser from which the dust is ejected downwards by compressed air through a grid to assist in obtaining even application. - L.K. [58(75.3)]

1505. COOKE, F.C. Imperata cylindrica. A curse of tropical agriculture. World Crops, 1960, 12,(7),252-3, figs.2.
Includes the information that a Vibro-Rota tiller - a combination of a vibrating spring-tine harrow and a rotary cultivator will bring underground roots to the surface. - L.K. [O.W.]

1506. FRANCE. Caracteristiques et prix des principaux materiels de traitement. [Characteristics and prices of spraying and dusting equipment.] Marchand-Rep.Tracteurs Machines agric., 1959, 6,62-73,75,77,79.
French and foreign, currently obtainable on the French market. - From Fruits, 15,(5), 141,11409. - D.M.L.S.

PHYSIOLOGY, MORPHOLOGY AND ANATOMY

See also 1391,1473,1497,1539.

1507. MINSHALL, W.H. Effect of 3-(4-chlorophenyl)-1,1-dimethylurea on dry matter production, transpiration, and root extension. Canad.J.Bot., 1960, 38,201-16, figs.5, tabs.4,bibl.19.
Extension growth of the chlorophyll-containing roots of Hydrocharis morsusranae was inhibited by 0.5 p.p.m. of monuron whereas concentrations close to the water saturation point of 230 p.p.m. were required to inhibit extension growth of the non-chlorophyll-containing attached roots of Zea mays and Phleum pratense and the detached roots of Pisum sativum.
A total of 15-20 µg of monuron/g fresh leaf applied through the cut petiole of detached primary leaves of Phaseolus vulgaris inhibited the increase of dry matter by 90% and suppressed transpiration 40-50%. Internal concentrations of 1-2 µg/g of monuron produced simultaneous enhancement of dry matter increase and of transpiration but concentrations of 5-10 µg/g produced a suppression of dry matter increase concurrently with an enhancement of transpiration. Age of leaf and the time of year in which the plants were grown altered the critical internal concentration levels required to affect dry matter increase and transpiration.
Analysis of detached leaves treated with 15-20 µg/g monuron indicated a marked suppression of the formation of non-water-soluble carbohydrate, a slight suppression of the formation of water-soluble nitrogen but little or no effect on water-soluble carbohydrate or on non-water-soluble nitrogen.
In detached leaves o-phenanthroline, fenuron and diuron resembled monuron closely in symptom development and in their effect on dry matter production and transpiration. Iodoacetamide, 2,4-dinitrophenol, and 8-hydroxyquinoline each produced some effects similar to monuron but differed from it in certain respects. Thiourea, sodium diethyldithiocarbamate, sodium fluoracetate, ethyl-N N-diphenylcarbamate and hydroxylamine hydrochloride were without noticeable effect. - Author's Summary. [231(71)]

1508. BINGHAM, S.W. and PORTER, W.K. (Dep.Bot.Plant Path.,Univ.,Baton Rouge, Louisiana,U.S.A.) Cotton I. The influence of N-(3,4-dichlorophenyl)methacrylamide on early growth and development. (Abstract) Proc.13th annu.Meet.Sth.Weed Conf., 1960, 214-5.
In greenhouse experiments Dicryl (N-(3,4-dichlorophenyl)methacrylamide) markedly suppressed the rate of development of cotyledons. Maximum inhibition of cotyledon weight was obtained when treated at the onset of most rapid growth. The time of treatment causing the greatest suppression of internode elongation coincided with that which caused the greatest inhibition of cotyledon development. True leaf development was at least temporarily suppressed for several days. Cell enlargement appeared to be uniformly suppressed without malformations of the tissue. Treated cotyledonary tissue contained substantially more nitrogen than untreated. In true leaves the N content increased as the weight increased. On a fresh weight basis, the N content of treated and untreated tissue was the same, indicating suppression of N accumulation in the same proportion as growth in treated leaves. When germinated in the dark in sandy loam soil, maximum stimulation of elongation of hypocotyl sections with indolylacetic acid (IAA) was suppressed by an equal weight concentration of Dicryl. Both IAA and Dicryl reduced elongation of intact roots of seedlings. Growth inhibition of cotyledons

by Dicryl increased with increasing periods of contact, the maximum being approached in about 3 hours. Penetration into the cotyledon tissue appeared to be quite rapid. - D.M.L.S. [O.W.]

1509. FUNDERBURK, H.H. and PORTER, W.K. (Dep.Bot.Univ.,Baton Rouge,Louisiana,U.S.A.) The influence of N-(3,4-dichlorophenyl) methacrylamide on some respiratory enzymes of corn. (Abstract) Proc. 13th annu.Meet. Sth.Weed Conf., 1960, 217.

Whereas the activity of ascorbic acid oxidase was about half that of polyphenol oxidase in untreated tissue, in treated tissue, from 3-4 days until the eighth day after treatment, it rose to become 4-5 times higher. This increase in ability to oxidise ascorbic acid was associated with dead and/or dying tissue since plants treated with steam also showed a large increase in the same ability. Cytochrome oxidase activity was found to be negative. It was found that boiling increased the ability of homogenates of both treated and untreated tissue to oxidize ascorbic acid, and ionic copper caused a similar increase in boiled and unboiled homogenates of treated and untreated tissue. However, in each case there was a wide difference between the response of homogenates of treated and untreated tissue.

The R.Q. of treated tissue 2 days after treatment was 0.77 and of control tissue 0.89, indicating that more proteins were metabolized in treated tissue.

Supernatant (144 000 x g) from treated tissue did not possess as great an inhibitory power of nonenzymatic ascorbic acid oxidation as control supernatant; it also contained considerably more nitrogen than control.

It was concluded that the high ascorbic acid oxidase activity in treated tissue was due to a removal of natural inhibitors of ascorbic acid oxidase, and that the wide differences encountered in boiled tissue (non-enzymatic) were due to an increased metabolism of nitrogenous materials in treated tissue. Proteins and amino acids are known to inhibit the non-enzymatic oxidation of ascorbic acid. - D.M.L.S. [O.W.]

1510. BINGHAM, S.W. and PORTER, W.K. (Dep.Bot.Plant Path.,Univ.,Baton Rouge, Louisiana,U.S.A.) The activity of certain enzymes from plants treated in the cotyledon stage with N-(3,4-dichlorophenyl) methacrylamide. (Abstract) Proc. 13th annu. Meet.Sth.Weed Conf., 1960, 216.

Respiration of cotyledonary tissue slices of plants treated with N-(3,4-dichlorophenyl) methacrylamide (Dicryl) was more or less unaffected on a nitrogen (N) basis and each cotyledon contained approximately the same amount of N indicating that Dicryl suppressed growth without any substantial effect on total respiration.

Tests employing certain substrates (ascorbate, catechol, and cytochrome c + p-phenylenediamine) suggested that ascorbic acid oxidase is the predominating terminal enzyme. Rather high DIECA inhibition of ascorbic oxidase supported this theory. The slight inhibition of respiration with carbon monoxide was not light reversible indicating little or no cytochrome oxidase activity or that it was resistant to carbon monoxide inhibition.

On an N basis, although Dicryl tended to affect the respiration rate, ascorbic oxidase activity was greatly suppressed; since ascorbic oxidase activity was closely parallel for treated and untreated tissue on a fresh weight basis, it appeared that the amount of suppression was proportional to the effect on growth. Ascorbic oxidase activity was found to be primarily associated with the residue at 1000 x g.

The oxidation of combined substrates (ascorbate and catechol) appeared to be additive. Ascorbate did not act as an electron source for reduction of quinones. - D.M.L.S. [O.W.]

1511. RIEPMA, P. (Marijkelaan 6,Bennekom, Netherlands). Interrelationships between methods of spray application, retention, and weather conditions on the herbicidal efficiency of 2,4-dinitro-ortho-cresol. Plant & Soil, 1960, 12,(3),223-48, figs.10,tabs.11,bibl.26.

Employing 4 test plants (Brassica napus, Fagopyrum esculentum, Pisum sativum and Triticum vulgare), the author investigated and reports on: (1) the effects of varying the spray output (0.55 to 20 mm^3/cm^2) and the nozzle orifice (mean mass diameter of spray droplets 160-408 μ) on retention by the shoots of young seedlings; (2) the effect on retention of lowering the surface tension of the spray solution or pre-treating plants of P. sativum with TCA; and (3) the relation between the amount of spray retained and the LD 50 of DNOC on F. esculentum, P. sativum and B. napus.

Statistical analysis of a series of experiments undertaken at different seasons of the year on B. napus demonstrated that the magnitude of the equi-effective dose of DNOC was primarily dependent on the total solar radiation received during the first few hours

after the spray application. - From Author's Summary (modified). - D.M.L.S. [196(492)]

1512. MÜHLING, G.N., van't HOF, J., WILSON, G.B. and CRIGSBY, B.H. Cytological effects of herbicidal substituted phenols. Weeds, 1960, 8,(2),173-81, figs.3,tabs.1, bibl.20.

Pea seedlings with a primary root 2.5-3 cm long were suspended above Hoagland's medium to which had been added 2,4-dichlorophenol, 2,4-dichlorophenoxyethanol, 2,4-D, 2,3,4-trichlorophenoxyacetic acid, 2,4,6-trichlorophenoxyacetic acid (1), 2,4-DB, 3Y9, bis(2,4-dichlorophenoxyethyl)phosphite, 2,4-dinitrophenol (2) or phenol. All compounds caused a reaction quantitatively and qualitatively similar to colchicine and an ultimate inhibition of the onset of cell division. 2,4-D and (2) were also found to act as prophase poisons. All compounds appear to be potential polyploidising agents, but only in the case of (1) were significant amounts recovered. - From Authors' Summary (modified). - L.K. [O.W.]

1513. FOY, C.L. Studies on the absorption, distribution and metabolism of 2,2-dichloropropionic acid in relation to phytotoxicity. Ph.D.Thesis, Univ.Calif., 1958.

Field, greenhouse and laboratory studies with commercial, industrial and pure dalapon labelled Cl^{36} or C^{14} or pure + wetters etc., were made on cotton, sorghum, maize and Tradescantia. There is an extensive review of American literature. Conclusions include: (1) Accumulation in the 'seed' was traced through 3 generations of wheat. Germination of seeds of cotton from treated plants was delayed for more than 2 years. (2) Movement of dalapon is associated with movement of metabolites and so is accumulation. Retranslocation can occur. (3) In cotton, dalapon is very stable as the intact molecule. (4) Taken up through the roots, dalapon is distributed throughout young sorghum and cotton plants within 1 hour. (5) Entry through leaves is very slow and may continue for more than 2 weeks as long as no acute toxicity results. (6) Movement is affected by retention by tissues 'en route'. (7) Addition of a wetter is very important - as much dalapon is absorbed in 1 hour (with wetter) as in 2 weeks (without wetter). (8) The specificity of dalapon is not related to uptake or movement or accumulation and it is likely that resistance or susceptibility is biochemical. - G. Sagar. [O.W.]

1514. TOLBERT, N.E. (State Univ.,E.Lansing, Michigan,U.S.A.) (2-chloroethyl)trimethylammonium chloride and related compounds as plant growth substances. II. Effect on growth of wheat. Plant Physiol., 1960, 35,(3),380-5, figs.3,tabs.5,bibl.1.

(2-chloroethyl)trimethylammonium chloride and a number of other related quaternary ammonium compounds produced a variety of growth regulatory effects on wheat. - K. Holly. [O.W.]

1515. UNITED STATES. Chemical and physiological studies. [6 Reports] Res.Progr.Rep.West.Weed Control Conf., 1960, 69-73.

Oats were found to absorb amitrol much more rapidly than barley; barley converted a greater % of the absorbed material to a form insoluble in alcohol; oats gave off more labelled CO_2 than barley and did not show any reduction after 6 hours as did barley.

2,4-DB may be estimated colorimetrically by reacting with 0.2 ml of 35% formaldehyde in in 10 ml concentrated sulphuric acid (this reagent stores for 1 or 2 days only). A drop of NaOH is added to about 3 ml of the 2,4-DB solution and evaporated to dryness; 10 ml of the reagent is added, shaken well and stood for 10 minutes for the magenta colour to develop. This method will detect 5 µg of 2,4-DB. 2,4-D does not react in this way and other aromatic compounds may interfere in this method.

Chromatographing sap of maize that had been allowed to react with atrazine indicated the probable presence of a hydroxy derivative.

2,4-D was found not to increase the absorption of glucose by bean stem tissue after 2 days, but after 7 days it was increased 3 times. 2,4-D increased the amount of glucose katabolised by glycolysis; evidence was obtained that the synthetic pathway was unaffected.

2,4-D and 2,4,5-T depressed photosynthesis in all species tested; in beans 2,4,6-T and 2,6-D stimulated photosynthesis, while in maize 2,4,6-T caused slight inhibition; pentachlorophenoxyacetic acid was also inactive on beans and inhibitory to maize. In peas and maize, sulphate and phosphate uptake were inhibited by 2,4,5-T > 2,4,6-T > 2,4-D > 2,6-D; sulphate absorption was affected more than phosphate absorption but neither compound affected calcium uptake. 2,4-D caused a greater increase of IAA oxidation by maize root tissue than 2,4,5-T or 2,4,6-T; 2,4,6-T disturbed IAA metabolism

whereas 2,4,5-T apparently did not. Evidence was also obtained that the toxic effects of 2,4-D and 2,4,5-T are not connected with disturbed acetate metabolism. - L.K. [O.W.]

1516. HULL, H.M. (A.R.S., U.S.Dep.Agric., Box 5735, Tucson, Arizona, U.S.A.) A tabular summary of research dealing with translocation of foliar-applied herbicides and selected growth regulators. Weeds, 1960, 8,(2),214-31, tabs.1, bibl.87.

A table summarises information on the translocation of 12 herbicides and of a number of related compounds in several plants. The direction of movement (acropetal or basipetal) and the literature reference is given in each case. - L.K. [O.W.]

1517. CRAFTS, A.S. and YAMAGUCHI, S. (Univ., Davis, California, U.S.A.) Absorption of herbicides by roots. Amer.J.Bot., 1960, 47,(4),248-255, figs.3, bibl.38.

An autoradiographic technique was used to study the distribution of radioactivity in barley, kidney bean, cotton and Zebrina following application of C^{14} labelled 2,4-D in the culture solution. Only in cotton did a considerable amount move into the foliage, although absorption appeared to occur in all cases. In addition labelled amitrol, MH, urea, monuron, dalapon, simazine, IAA and P^{32} were presented to roots of barley plants and considerable variations found in the ensuing distribution within the plant. - K. Holly. [O.W.]

1518. YAMAGUCHI, S. and CRAFTS, A.S. (Univ., Berkeley, California, U.S.A.) Comparative studieswith labeled herbicides on woody plants. Hilgardia, 1959, 29,(4), 171-204, figs.16, tabs.1, bibl.13.

Observations over a period of 1 year of the movement of C^{14} labelled herbicides applied as spot treatments to the active phloem of trunks 1-2 in. in diameter of manzanita (Arctostaphylos manzanita), toyan (Photinia arbutifolia) and buckeye (Aesculus californica) showed that in all 3 species 2,4-D and 2,4,5-T were the least mobile but with most downward movement, amitrol was of intermediate mobility and downward tracing and MH and urea were the most mobile but with least downward tracing. Amitrol was strongly absorbed by the xylem. Maximum movement coincided with the period of maximum growth. Upward tracings were not so clear cut. For monuron the extent and intensity of upward and downward tracings were < MH and urea in manzanita and > MH and urea in buckeye. In toyan, monuron showed greater absorption and more intense tracing than MH and urea.

In greenhouse experiments in October young rapidly growing toyan 1.5 ft tall were treated 8-8.5 in. from stem tip for 24 hours. All the chemicals showed predominantly upward movement and tracing in both mature and young leaves; 2,4-D also moved downward; monuron showed tracings in mature leaves only. In seedlings cut to remove the epidermis and cortical tissue at the point of application of the herbicide, the amount of chemical carried to the leaves was doubled except for amitrol. In field experiments in September the solutions were applied to the cut bark of toyan sprigs carrying two years' foliage. There was no evidence of downward movement; upward movement was restricted.

In 3 experiments in July to study the nature of the mobility in 3 year old manzanita (A. viscida) 8 in. tall, the solutions were applied to (a) the 'cut' stem (i.e. outer bark removed at the point of application) for 2 hours, (b) 'uncut' stem for 24 hours, (c) 'cut' stem for 24 hours. (a) All the solution was absorbed. 2,4-D, amitrol, MH and urea showed strong absorption in xylem and inner bark for 2 in. above the application level; monuron showed intense upward tracings in the bark for 1.5 in. 2,4,5-T showed little movement. MH, urea and 2,4,5-T showed downward movement for a few in. (b) Movement was mainly upward but much less than in (a) except for monuron which also showed large lateral movement towards the outer bark. (c) The amount of isotopes in leaves was MH > amitrol > monuron > 2,4,5-T > 2,4-D > urea. Urea showed lateral movement. 2,4-D, 2,4,5-T, amitrol, MH and urea showed root tracing but not monuron.

Four experiments in August on willow plants to obtain evidence for phloem movement in downward translocation are described.

(a) The active phloem of stems with diameter 0.75 in. was treated with 2,4-D, amitrol, MH or monuron as controls; the intact side of the stem was treated at the same level with the same chemical but the xylem was exposed 1 in. above and below the treatment spot. Autoradiographs showed:- both upward and downward tracing for 2,4-D, amitrol and MH and upward only for monuron in the control experiment; upward tracing only for all 4 chemicals in the experimental treatment.

(b) Phloem continuity was broken by cutting the bark (i) above and (ii) below the treatment spot. In (i) downward tracing was inhibited except that caused by some lateral transfer; (ii) showed downward tracing to the break. (c) Phloem and xylem were

separated by making 2 longitudinal slits in the bark 0.375 in. apart and inserting a polythene strip. Solutions were applied 1 in. above the cut. Downward movement occurred in the phloem without a definite trace in the xylem. Movement was < 50% of that in the control experiment (a). (d) In willow branches 1.5-3 in. in diameter, the bark was loosened from the xylem over a distance of 4 in. Solutions were applied to active phloem 1 in. from the top of the loosened strip. Autoradiographs showed that monuron and amitrol moved into the xylem equally well through torn and intact cambial tissues. Movement of MH and 2,4-D into the xylem through torn tissues was < 50% that through intact tissues.- M.E.L. [O.W.]

1519. WILLIAMS, M.C., SLIFE, F.W. and HANSON, J.B. (State Univ.,Logan,Utah,U.S.A.) Absorption and translocation of 2,4-D in several annual broadleaved weeds. Weeds, 1960, 8,(2),244-55, figs.3,tabs.4,bibl.10.
Weed species which were resistant (Xanthium commune and Polygonum pensylvanicum) or sensitive (Datura stramonium and Sicyos angulatus) to 2,4-D tended to react in a similar manner to root and shoot applications. Leaf discs of resistant plants absorbed considerably more 2,4-D than those of sensitive plants; resistant plants also absorbed and translocated more 2,4-D than sensitive plants.
There was little difference in the evolution of $C^{14}O_2$ from 2,4-D labelled in the side chain. Transmission of 2,4-D from a treated to an untreated branch of Xanthium was negligible if the untreated branch had several mature leaves. Treating Datura scions with 2,4-D had little effect on the tomato stock. S. angulatus in the 5-6 leaf stage was killed by 30 p.p.m. 2,4,5-T. - Mainly from Authors' Summary. - L.K. [O.W.]

1520. MORRE, D.J. and ROGERS, B.J. (Purdue Univ.,Lafayette,Indiana,U.S.A.) Differential uptake of 2,4-D acid and its octyl ester by seedling corn roots and coleoptile sections. Plant Physiol., 1960, 35,(3),324-5, figs.2,bibl.7.
Measurement of C^{14} in tissue showed uptake of 2,4-D acid by maize roots to be greater than that of 2,4-D octyl ester, but the reverse to be the case with maize coleoptile sections. - K. Holly. [O.W.]

1521. FANG, S.C., TEMTY, F. and BUTTS, J.S. (Oregon State Coll.,U.S.A.) Influence of 2,4-dichlorophenoxyacetic acid on pathways of glucose utilization in bean stem tissues. Plant Physiol., 1960, 35,(3),405-8, figs.1, tabs.2,bibl.7.
Internode sections from kidney bean plants treated earlier with 2,4-D were incubated in buffer containing C^{14} labelled glucose. Uptake of glucose and yield of respiratory CO_2 were increased. There was a relative increase in the amount of glucose catabolised via the glycolytic sequences. - K. Holly. [O.W.]

PATENTS

1522. GREAT BRITAIN. s-Triazines. British Patent, 1959, 814 947/9.
Synthesis and melting points of s-triazines. To J.R. Geigy Akt.Ges. - From Chem.Abstr., 54,9194h. - M.E.L.

1523. APPLEGATH, F., BARNES,M.D., FRANZ, R.A., GLASS,K.I. and MEEK, R.L. Ureas. British Patent, 1959, 818 864.
Synthesis. To Monsanto Chemical Co. - From Chem.Abstr., 54,9774b. - M.E.L.

1524. BARNSLEY, G.E., EATON, J.K. and AIRS, R.S. Compositions for controlling plant growth. British Patent, 1959, 818 925.
Organo-boron acids and their anhydrides, esters, and complexes with nitrogenous bases are effective as pre- or post-em. weed killers. Suitable compounds are halo-, methyl-, halomethyl- and methoxy-substituted phenylborinic and diphenylborinic acids, and unsubstituted diphenylborinic acid. Cl is the preferred halogen substituent. More than 1 substituent per phenyl group may be used if 1 position ortho to the B atom is unsubstituted. The choice of substituents permits selective toxicity. Thus, bis(4-chlorophenyl)borinic acid is highly toxic to both mono- and dicotyledons, whereas diphenylborinic acid is toxic to dicotyledons and inert to monocotyledons. The compounds are applied as mixtures with a surface-active agent, an inert solid carrier, or an inert liquid carrier which can be a solvent for the organoboron compound. - Chem.Abstr., 54, 7964h.

1525. GREAT BRITAIN. Carbamyl and alkoxycarbonyl-substituted phenylureas as herbi-

cides. British Patent, 1959, 819 853.
The title compounds were effective as herbicides in cotton and corn, particularly against mustard [Brassica sp.] and charlock [Sinapis arvensis]. To Farbenfabriken Bayer Akt.Ges. - From Chem. Abstr., 54,6019d. - M.E.L.

1526. PFEIFFER, R.K. Mixtures of polychlorobenzoic acids and substituted phenoxyalkanoic acids as herbicides. British Patent, 1959, 821 039.
To Fisons Pest Control Ltd. - From Chem. Abstr., 54,7057h. - M.E.L.

1527. LORD, J.G. Potassium α-(4-chloro-2-methylphenoxy)propionate for use as a herbicide. British Patent, 1959, 822 973.
Synthesis. To Boots Pure Drug Co.Ltd. - From Chem.Abstr., 54,7964g. - M.E.L.

1528. d'OGNY, F. Contact herbicides. German Patent, 1957, 1 015 643.
cf. French Patent, 1957, 1 129 584. Weed Abstr., 9,755. To Pechiney-Compagnie. From Chem.Abstr., 54,6019d. - M.E.L.

1529. AMATSU, H. and IWANAGA, S. Regulation of herbicides for water weeds. Japanese Patent, 1959, 97.
Mixture of 2,4-D (ethyl) and sodium carboxymethyl cellulose which breaks. To Nissan Chem.Industries Ltd. - From Chem.Abstr., 54,7056i. - M.E.L.

1530. GROSZOS, S.J. and STAFIEJ, S.F. Borazoles. U.S. Patent, 1959, 2 892 869.
Synthesis. To American Cyanamid Co. - From Chem.Abstr., 54,8869c. - M.E.L.

1531. McMANIMIE, R.J. Cyclic orthoborates. U.S. Patent, 1959, 2 894 020.
Synthesis. To Monsanto Chem.Co. - From Chem.Abstr., 54,8631f. - M.E.L.

1532. FOOKES, J.H. Nitrated butyl phenyl ethers of polyglycols. U.S. Patent, 1959, 2 912 456.
Synthesis. To Dow Chemical Co. - From Chem.Abstr., 54,5572e. - M.E.L.

1533. CAMERON, M.D. Herbicidal compositions containing bis(2-methyl-5-ethylpyridine) copper (II) chloride. U.S.Patent, 1959, 2 913 323.
Synthesis. To Monsanto Chemical Co. - From Chem.Abstr., 54,6019h. - M.E.L.

1534. FRAZZA, E.J. and RAPOPORT, L. β,β'-Dicyanovinyl thioether. U.S. Patent, 1959, 2 916 511.
Synthesis. To American Cyanamid Co. - From Chem.Abstr., 54,5476d. - M.E.L.

1535. HARMAN, M.W. and D'AMICO, J.J. Controlling vegetation. U.S. Patent, 1959, 2 919 182.
To Monsanto Chem.Co. - From Chem.Abstr., 54, 10226b. - M.E.L.

MISCELLANEOUS

1536. WIESE, A.F., BOND, J.J. and ARMY, T.J. (Agric.Exp.Sta.,Coll.Sta.,Texas, U.S.A.) Chemical fallow in the southern Great Plains. Weeds, 1960, 8,(2),284-90, figs.1,tabs.4,bibl.16.
The use of herbicides to control weed growth after harvest instead of sweep tillage in an area liable to wind erosion decreased the moisture content of the soil, probably on account of the inadequate weed control obtained. - L.K. [O.W.]

1537. RICHARDS, R.F. (Geigy Agric.Chem., Ardsley,N.Y.,U.S.A.) Recent research results with simazine and related triazines. Proc. 13th annu.Meet.Sth.Weed Conf., 1960, 228-34, tabs.1,bibl.13.
A brief review of the capabilities and promise with suggested fields for further research. - D.M.L.S. [O.W.]

1538. GREAT BRITAIN. Agricultural Chemicals Approval Scheme. Pest.Technol., 1960, 2,(9), 22-4.
The provisions of this new voluntary scheme for the approval of herbicides, fungicides and insecticides and which replaces the Crop Protection Products Approvals Scheme are outlined. The main difference between the 2 schemes is that the Ministry of Agriculture will now be able to conduct independent trials and have full access to the trials conducted by applicants for the approvals mark. - L.K. [O.W.]

1539. UNITED STATES. Report of the Research Committee. Proc.13th annu.Meet. Sth.Weed Conf., 1960, 297-442.
Consists of: (1) tables of results of preliminary tests of herbicides on a number of crops - the new herbicides include prometone [methoxy propazine], simetone [methoxy simazine], Zytron [O-(2,4-dichlorophenyl)-O-methyl isopropylphosphoroamidothioate], Dacthal [dimethyl-2,3,5,6-tetrachloroterephthalate], atratone [methoxy atrazine], Dicryl [N-(3,4-dichlorophenyl) methacrylamide], 1-chloro-N'-(3,4-dichlorophenyl)-N N-dimethylformamidine, N-propyl-di-propylthiolcarbamate, ethyl ethyl-N-butylthiolcarbamate, propyl ethyl-N-butylthiolcarbamate, 2-chloro-4-methylamino-6-isopropylamino-s-triazine, N-butyl-2,2-propoxybenzoate, fenac, 2-chloro-4-dimethylamino-6-ethylamino-s-triazine; (2) control of woody weeds; (3) special weed problems - Johnsongrass [Sorghum halepense],Bermudagrass [Cynodon dactylon] and nutsedge [Cyperus spp.]; (4) aquatic weeds, new compounds include - hexachlorocyclopentadiene, 2-chloro-4-flucrophenoxyethanol (also as TCA ester), 2-chloro-4-fluorophenoxyacetate (dimethylamine and n-butyl ester); (5) soil sterilisation; (6) control of agricultural weeds - Convolvulus arvensis, Sida hederacea, and Sorghum halepense; (7) climatic, edaphic and physiological studies - very brief reports on (a) the dormancy of wild garlic [Allium vineale] bulbs, (b) penetration of herbicides in the soil, (c) effect of carriers on the movement of chlorpropham in the soil, (d) the effect of age on the response of cotton seedlings to herbicidal oil, (e) uptake and distribution of simazine in oat and cotton seedlings, (f) nutgrass [Cyperus rotundus] susceptibility to amitrol, (g) the effects of N-(3,4-dichlorophenyl) methacrylamide on certain enzymes and on the early growth and development of cotton, (h) the relative absorption of cotyledons and leaves of velvet mesquite, (i) the stimulation of witchweed seed germination by 6-substituted purines and (j) the inhibition of photochemical activity of isolated chloroplasts by certain phenylamides; (8) the evaluation and properties of new herbicides including ethyl ethylpropylthiolcarbamate, 2-methoxy-4-methylamino-6-isopropylamino-s-triazine, methoxy ipazine, 2-(sodiumsulpho)ethyl-2,2-dichloropropionate and 3-(3,4-dichlorophenyl)-1-isopropyl-1-(2-propynyl)urea; (9) report of the Terminology Committee and (10) Glossary. - L.K. [O.W.]

1540. GREAT BRITAIN. Soil sterilization. Adv.Leafl.Min.Agric.Fish.Fd, 1960, 319, pp.8.
Gives instructions for sterilising soil by steam, chemicals (formaldehyde, tar acids, chloropicrin, SMDC), hot gas and electricity. - L.K. [O.W.]

1541. BEHRENS, R. and MORTON, H.L. (Univ.,St.Paul,Minnesota,U.S.A.) An environment system for plant studies with controlled temperature, humidity, and light. Weeds, 1960, 8,(2),182-6, figs.3.
The system described, which cost $2200 exclusive of labour, consists of 4 growth chambers 2.5 x 1 x 7 ft in each of which the environmental conditions may be varied independently. - L.K. [O.W.]

1542. DAVIDSON, W.A. Regulatory aspects of weed control. [5 Reports] Abstr.Meet. Weed Soc.Amer., 1960, 54-6. [O.W.]

1543. HARVEY, W.A. Teaching and extension aspects of weed control. [6 Reports] Abstr. Meet.Weed Soc.Amer., 1960, 57-61.
Subjects discussed include:- the development of an extension weed control programme; the activities of California State Weed Committee; "selling" weed control to farmers; programme projection in weed control; and the Oregon State highway weed control programme.- D.M.L.S. [O.W.]

1544. BERKHOUWER, P. (Rijkslandbouwconsulentschap,Purmerend,Netherlands). De planteziekten - en onkruidbestrijding in zuidelijk noord-Holland. [Plant disease and weed control in southern north Holland.] Landbouwvoorlichting, 1959, 16,(11),611-5, (Du.)
Discusses developments since 1945 and advisory work with farmers and contractors. - L.K. [198(492)]

1545. BUNCH, H.D. (State Coll.,Mississippi,U.S.A.) The value of weed control in the production of high quality seed. Proc. 13th annu.Meet.Sth.Weed Conf., 1960, 25-9.
The table lists the most important weeds in seed crops of maize, sorghum, cotton, soybeans, small grains, lespedezas, rice, grasses and crimson and white clovers in the Southern U.S.A. and indicates those, the seeds of which may be removed in seed cleaning. - L.K. [O.W.]

List of Common Names and Chemical Abbreviations

Revised August, 1960.

The following list, based on that adopted by the Weed Society of America has been approved by the British Weed Control Council, except those marked □.

An asterisk (*) signifies common names approved by the B.S.I.

A plus sign (+) signifies approval by the Weed Society of America.

amiben □+	3-amino-2,5-dichlorobenzoic acid
amitrole □+	3-amino-1,2,4-triazole
AMS □+	ammonium sulphamate
atrazine □+	2-chloro-4-isopropylamino-6-ethylamino-1,3,5-triazine
barbane □	4-chloro-2-butynyl-N-(3-chlorophenyl)carbamate
CDAA +	2-chloro-NN-diallylacetamide
CDEA +	2-chloro-NN-diethylacetamide
CDEC +	2-chloroallyl-NN-diethyldithiocarbamate
chlorpropham *	isopropyl-N-(3-chlorophenyl)carbamate
4-CPA +	4-chlorophenoxyacetic acid
4-CPB	4-(4-chlorophenoxy)butyric acid
2,4-D +*	2,4-dichlorophenoxyacetic acid
3,4-DA +	3,4-dichlorophenoxyacetic acid
dalapon +*	2,2-dichloropropionic acid
2,4-DB *	4-(2,4-dichlorophenoxy)butyric acid
DCU +□	dichloralurea
2,4-DEB +	2,4-dichlorophenoxyethyl benzoate
2,4-DES *	sodium 2,4-dichlorophenoxyethyl sulphate
dichlone +*	2,3-dichloro-1,4-naphthaquinone
dinosam *	2-s-amyl-4,6-dinitrophenol
dinoseb *	2-s-butyl-4,6-dinitrophenol
diquat +*	1,1'-ethylene-2,2'-dipyridylium dibromide
diuron +	N-(3,4-dichlorophenyl)-N'N'-dimethylurea
DMTT + □	3,5-dimethyltetrahydro-1,3,5,2H-thiadiazine-2-thione
DNOC *	2-methyl-4,6-dinitrophenol or 3,5-dinitro-o-cresol
2,4-DP	2-(2,4-dichlorophenoxy)propionic acid
endothal +	3,6-endoxohexahydrophthalic acid
EPTC +□	ethyl-NN-dipropylthiolcarbamate
erbon +	2-(2,4,5-trichlorophenoxy)ethyl-2',2'-dichloropropionate
fenac □+	2,3,6-trichlorophenylacetic acid
fenuron +	N-(phenyl)-N'N'-dimethylurea
ipazine □+	2-chloro-4-diethylamino-6-isopropylamino-1,3,5-triazine
MCPA +*	4-chloro-2-methylphenoxyacetic acid
MCPB *	4-(4-chloro-2-methylphenoxy)butyric acid
MCPES +	sodium 4-chloro-2-methylphenoxyethyl sulphate
mecoprop *	dl-2-(4-chloro-2-methylphenoxy)propionic acid
MH +□	maleic hydrazide
monuron +*	N-(4-chlorophenyl)-N'N'-dimethylurea
neburon +	N-(3,4-dichlorophenyl)-N'-butyl-N'-methylurea
NPA +	N-1-naphthylphthalamic acid
PCP +	pentachlorophenol
PMA +	phenyl mercuric acetate
propazine +□	2-chloro-4,6-bis(isopropylamino)-1,3,5-triazine
propham *	isopropyl-N-phenylcarbamate
simazine +	2-chloro-4,6-bis(ethylamino)-1,3,5-triazine
SMDC +□	sodium methyl dithiocarbamate
2,4,5-T +*	2,4,5-trichlorophenoxyacetic acid
2,4,5-TB	4-(2,4,5-trichlorophenoxy)butyric acid
2,3,6-TBA +	2,3,6-trichlorobenzoic acid
TCA +	trichloroacetic acid
2,4,5-TES +	sodium 2,4,5-trichlorophenoxyethyl sulphate
2,4,5-TP	2-(2,4,5-trichlorophenoxy)propionic acid
trietazine +□	2-chloro-4-diethylamino-6-ethylamino-1,3,5-triazine
3Y9 □	tris-(2,4-dichlorophenoxyethyl)phosphite

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Prepared monthly by the Information Section, Agricultural Research Council Unit of Experimental Agronomy, Department of Agriculture, Parks Road, Oxford, England, and distributed by the British Weed Control Council, c/o National Association of Corn and Agricultural Merchants, Cereal House, 58, Mark Lane, London, E.C.3. on subscription at £2 - 2 - 0 per year.